THE USE OF PERCUSSION IN THERAPY: A REALIST SYNTHESIS

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THE USE OF PERCUSSION IN THERAPY: A SYSTEMATIC REVIEW

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Abstract

Background: Percussion use is common in both music therapy clinical practice and in publications. However, no comprehensive review regarding the use of percussion instruments in music interventions appears to exist. The investigator examined the various literature review types available in order to address the complex and contextual nature of percussion-related interventions. The purpose of this study was to conduct a realist synthesis-type systematic review of the literature regarding the use of percussion in therapy in order to answer the following research questions.

Research Questions:

1. When using published tools designed to evaluate quality of research, what was the outcome of this appraisal process when reviewing identified studies?
2. What are the context-mechanism-outcome configurations within percussion-related interventions as found through the systematic review process?

Methods: Literature review types were examined in order to locate a systematic review type that best fit the research questions. The investigator used a prior database from Matney (in press), and employed inclusion/exclusion criteria to locate studies with reduced bias and increased study rigor. Eligible studies were examined using methodological evaluation tools, which were corroborated through inter-rater reliability. The investigator created evidence tables that included context-mechanism-outcome configurations (CMOC's). These configurations were examined for larger patterns that may inform theory development. The investigator linked chains of evidence in accordance with the realist synthesis methodology, and offered CMOC propositions.

Results: Results revealed that 30.91% of studies prior to eligibility screening did not report internal review board or consent procedures. Regarding experimental studies evaluated after screening, 34.79% did not report the type of randomization procedure used, and 43.48% were unclear regarding concealment of allocation. Reporting within qualitative and mixed-methods studies also lacked transparent reporting. The investigator presented CMOC's for each individual study, and proposed evidence linkage that may promote theory development regarding percussion interventions.

Conclusions: The percussion-related intervention literature that was evaluated demonstrates a lack of study rigor (internal review board and/or consent procedures, intention to treat principle), a lack of transparent and detailed reporting (randomization details, allocation concealment, treatment consistency amongst groups), as well as a lack of replication and transferability. While context-mechanism-outcome configurations can only provide tentative theory development due to the paucity of connections available, the literature suggests that particular mechanisms may promote effective outcomes in particular situations. The investigator provides implications for future research, clinical practice, and pedagogy.

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CHAPTER I

Introduction

Music therapy organizations and publications have noted the importance of evidence-based practice. The American Music Therapy Association (n.d.) defines music therapy as ‘‘the clinical and evidence-based use of music interventions to accomplish individualized goals… .” Edwards (2005) described the increasing need for music therapy to “demonstrate its effectiveness through the presentation of evidence” (p. 293). The author then offered examples of some of the different types of evidence a researcher may present. Else and Wheeler (2010) described the importance of research-based efficacy and clinical effectiveness for building a balanced evidence base for the music therapy profession.

A sound evidence base requires clear communication of its evidence. Such clarity applies to intervention reporting in research, as well as to documentation in clinical practice. In the case of intervention reporting, clear evidence includes any detail that promotes study replication, study limitation, and clinical application. Music therapists have described a need for a more detailed, rigorous, and transparent evidence base for music in health care. After reviewing pediatric literature, Robb and Carpenter (2009) noted that intervention reporting lacked in eight areas: (a) music qualities, (b) intervention materials, (c) intervention components, (d) intervention delivery schedule, (e) interventionist, (f) treatment fidelity, (g) setting, and (h) music delivery method. Due to these inadequacies, Robb, Burns, and Carpenter (2011) proposed guidelines for music-based interventions in research. These authors addressed the need for specificity in reporting the method of intervention. Enhanced specificity promotes transparency, increases applicability of studies to clinical practice, and facilitates replication in research. The call for demonstration of intervention effectiveness is

not exclusive to music therapy. Health care practice is undergoing a shift in expectations regarding intervention reporting. According to Melnyk and Morrison-Beedy (2012), many common medical interventions are not adequately supported by an assessment of their effectiveness (p. xv). Therefore, researchers in many health care fields are increasing expectations of study transparency so that measurement of effectiveness, or lack of such, can be clearly articulated to clinicians.

In order to promote increased rigor, consistency, and transparency in reporting, prominent health care journals have also asserted the use of publication standards and evaluation guideline tools. These tools include, but are not limited to, the following: (a) *Consolidated Standards of Reporting Trials* (CONSORT) (CONSORT, 2010), (b) the Checklist to Evaluate a Report of a Nonpharmacological Trial (CLEAR NPT) (Boutron et al., 2005) for experimental research, (c) the Consolidated Criteria for Reporting Qualitative research (COREQ) (Tong, Sainsbury, & Craig, 2007), (d) the Mixed-methods Appraisal Tool (Pluye, Gagnon, Griffiths, & Johnson-LaFleur, 2009), (e) the PRISMA checklist for systematic reviews (Moher, Liberati, Tetzlaff, Altman, & the PRISMA group, 2009), and (f) the RAMESES publication standards for meta-narrative and realist synthesis systematic review types (Wong, Greenhalgh, Westhorp, Buckingham, & Pawson, 2013). Music therapists have also developed procedures for qualitative research, including EPICURE (Gold, 2010; Stige, Malterud, & Midtgarden, 2009), and specific guidelines proposed by Aigen (2012). The above tools can promote attention to greater detail in intervention reporting, regardless of the epistemological, ontological, or methodological stance of the particular study.

More recently, Hanson-Abromeit (2015) proposed a framework for applying the therapeutic function of music through a therapist's analysis, translation, and application of

research, theory, and clinical evidence. The author connected the rating and analysis of research with the variability of clinical context, promoting an informed yet flexible format with which to create evidence-based interventions. Hanson-Abromeit therefore promotes transparency in clinical and research intervention reporting by detailing the synthesized characteristics of music for a particular need, as informed by the knowledge we currently have.

Various music therapy authors have articulated the contextual nature of music therapy. Kenny (1996) stated, "Music therapy is different to different people at different times in different places" (p. 3). Bruscia (1998) stated that contextual differences, such as those presented by population, setting, and need, require a wide range of clinical approaches. Each of these factors – population, setting, level of need, location, and time – can play a role in how a music therapy intervention operates.

Related to context, authors have also described the complexity of music therapy (Hanson-Abromeit, 2015; Robb, 2012; Ruud, 2010). Bruscia (1998) articulated this complexity as a *multiplicity*, which includes the interaction between science, art, and relationship. Similarly, Robb (2012) referred to the "complex interactions that occur between music, clients, and the education or healthcare environment" (p. 5). However, none of the authors provided details or direct examples that illustrate such complex interactions.

Each of the above authors have also discussed the importance of theory within these assertions of complexity; it is not satisfactory to merely understand that an intervention does or does not work; for these authors, it is important to understand *how* and *why* a particular intervention may or may not work. Likewise, social science researchers have progressively sought to answer not only whether an intervention is effective or not, but to better understand what works (or does not work) in what contexts for what reasons (Pawson & Tilley, 2004). A

straightforward example: While it is important to understand the biomedical efficacy of a vaccine on the overall population through rigorous randomized controlled trials, it is also important to understand why vaccines may be more clinically effective in some communities than in others. Socio-economically underprivileged communities may not achieve the same levels of effectiveness due to a variety of potential factors. Clients who have begun a vaccination protocol may not have transportation, which limits access to doctors, and therefore a reduction in important follow up visits. The residential community has a general distrust of the medical community, which may promote noncompliance to follow up protocols as well. In the case of efficacious biomedical interventions, theory development revolves around new and previously unobserved factors, such as promoting community access to services access, facilitating human agency, or developing rapport. These examples illustrate how a context may require new *mechanisms* in order to promote the same outcome. The researcher therefore develops theory to examine the mechanisms that inform the success or failure of an intervention.

The current complexity of music therapy work – because it uses many types of music methods with diverse populations, in a variety of settings, with therapists employing a wide range of orientations, and in collaboration with so many other types of professionals - requires a greater examination of the *hows* and *whys* that make music therapy work effective. Robb (2012) and Burns (2012) both described how theory informs intervention research. Burns (2012) examined the use of theory in oncology intervention research, noting that a majority of these studies did not provide such rationales. Robb (2012) acknowledged the value of outcomes-focused research, but also acknowledges its limitations:

> …(outcome-focused research) does not allow for the examination of questions about how and why the intervention did or did not work, and as a result it often

> falls short of providing clinically relevant knowledge to guide and advance practice. (p. 3)

Robb's differentiation of outcome-based research and theory-based research points to a common trend in health care literature, where interventions are no longer seen as linear, stimulus-response processes; intervention outcomes are now more commonly understood as caused by multiple interacting factors (music, clients, therapist, and the environment). A *theoretical framework*, according to Robb (2012) seeks to better understand the reasons that an intervention works or does not work. A theoretical framework seeks to promote an outcome by addressing the multiplicity of factors involved in any given intervention. These factors may be related to material components, environmental components, human agency, social constructs, and cultural considerations. In combination, these interactive factors may be understood as mechanisms of change in music therapy practice. A theoretical framework examines the complexity of an intervention process in order to more clearly and rigorously report effective (or ineffective) outcomes.

Music therapy researchers have also recently articulated the importance of reporting one's *knowledge framework* within research studies. A knowledge framework articulates the epistemological position, theoretical perspective, methodology, and methods of a study. Crotty (1998) defines epistemology as the theory of knowledge. In research, an epistemological position asserts what kind of knowledge is possible and legitimate. Aigen (2008) and Edwards (2012) both suggested that researchers describe the epistemological underpinnings in research reporting. Where Aigen focused on epistemological reporting in qualitative studies, Edwards promoted greater transparency in reporting epistemology in all types of research methodologies. Social science researchers have also asserted that reporting

one's epistemology, theoretical perspective, methodology, and methods promotes research transparency, replication, and clinical transfer (Alvesson & Sköldberg, 2009; Crotty, 1998).

Music therapists are therefore using various tools to advance the current evidence base within a complex field. The above examples include (a) reporting guidelines, (b) research evaluation tools, (c) theoretical frameworks for intervention reporting, and (d) knowledge frameworks for clearly reporting a study process. Investigators have also employed a broad range of different literature review types in order to critically analyze the current status of research. More recently, researchers have developed and employed different systematic review types in order to measure efficacy, articulate impact, and develop theoretical frameworks that inform interventions.

Percussion in Therapy

Documentation suggests that humanity has used percussion to promote health for millennia (Matney, 2007; in press). Traditional healers and musicians have used drums, shakers, and other instruments to promote focus, social interaction, and healing (Blades, 2005; Hart, 1991; Redmond, 1997). The use of percussion for therapy in the Western world was being discussed prior to the formal development of the field of music therapy (Bender & Boas, 1941; Goldstein, 1939) and before the creation of music therapy journals (Bruner, 1951; Denenholz, 1958; Gaston, 1951).

Descriptions of percussion use in music therapy formed during the initial years of the *Journal of Music Therapy* (Isern, 1964; Josepha, 1964; Lathom, 1964), the *British Journal of Music Therapy* (Alvin, 1968; Lovett, 1968), and *Music Therapy* (Alvin, 1981). Over time, publications have increasingly discussed the use of percussion in therapy, and have also intensified the level of study rigor (Matney, in press). In the last 20 years, authors have discussed particular therapeutic applications of percussion (how the instruments are used in an

intervention) and therapeutic functions of percussion (why the instruments are used) (Berger, 2002; Clair, 1996; Knight & Matney, 2012; Matney, 2007; in press; Reuer, Crowe, & Bernstein, 1995).

Music therapists appear to use percussion often in their clinical practice (Scheffel & Matney, 2014). Music therapists also appear to frequently discuss the use of percussion in books and journal articles (Matney, 2004; in press). Results of Matney (in press) and Scheffel and Matney (2014) suggest the following regarding the literature:

- Researchers and article authors have employed an array of methodologies to examine percussion use in therapy
- Percussion has been used with a broad range of populations
- Authors and clinicians have both described the use of percussion in improvisational, recreative, receptive, and compositional experiences, and have detailed those experiences with a broad range of application types.
- Authors and clinicians have described a large set of therapeutic functions and outcomes related to percussion-based music interventions.

The above suggestions imply that percussion use in therapy can also be understood as a complex process that seeks to promote effective outcomes in different contexts. However, no study to date has sought to associate effective or impactful interventions with theoretical frameworks.

Articulation of Prior Intervention Theories

Authors have discussed categories of musical function, both in general and more specific to percussion. Regarding musical functions, Merriam (1964) provided the following: (a) influence on physical response, (b) communication, (c) emotional expression, (d) symbolic

representation, (e) enforcing social norms, (f) validating through ritual, (g) contributing to the stability of culture, (h) contributing to integration of society, (i) aesthetic enjoyment, and (j) entertainment. Sears described the functions of music in therapy: (a) to influence behavior, (b) self-awareness, (c) relating to others, (d) communication, and (e) entertainment (1968, p. 33-35). Although more specific to a population, Brunk (2004) described nine therapeutic characteristics of music in relation to children diagnosed with autism which have transferability to other populations: (a) captivates and maintains attention, (b) structures time, (c) success-oriented, (d) safe place to practice social skills, (e) makes repetition and memorization enjoyable, (f) lets children control their environment, (g) creates or emphasizes a routine, (h) can reflect and adapt to each individual, and (i) mobility.

Where the above authors described general functions of music for health promotion, other authors have categorized therapeutic functions specifically related to percussion use. Reuer et al. (1995) provided the following reasons why percussion instruments are useful in therapy and wellness: (a) response to rhythm (auditory cues and movement link us to a temporal understanding of the world), (b) interest and enjoyment, (c) physical benefits, (d) social cohesion through musical creation and entrainment, and (e) accessibility (engaging regardless of experience level). Some early and common assumptions about percussion include its use for stimulation, organization, and movement (Gaston, 1968; Reuer et al., 1995).

Therapeutic functions of percussion have become a topic of recent research interest. Matney (2007) described the following therapeutic functions of percussion based on a prior content analysis (Matney, 2004) and his own personal experience as a percussionist and clinician: (a) accessibility (e.g., immediate musical response regardless of musical background), (b) rhythmic expression, (c) sensory stimulation (e.g., tactile feedback), (d)

physicality (i.e., a wide range of movements required to play instrumentation), (e) unique language (e.g., a focus on timbres and pitch differences, which in some cultures emulate qualities of language), (e) intentionality (e.g., promoting self-awareness and creativity through decision making on how to play), (f) expressivity (i.e., a unique mode for non-verbal expression), (g) interactive (e.g., accessibility and ability to share instruments can promote social engagement), (h) cultural diversity (i.e., instruments uniquely demonstrate aspects of various cultures), and (i) uniquely aesthetic (i.e., a musical experience that may be perceived as different from other instrumentation due to its broad range, as well as its salient musical and physical characteristics). Matney (in press) conducted a content analysis with a greater number of articles, and located the following overarching therapeutic functions: (a) social, (b) affective, (c) aesthetic, (d) expression, (e) communication, (f) engagement, (g) movement, (h) behavior, (i) sensory, (j) cognitive, (k) awareness, and (l) biological. While the functions in Matney (2007) more thoroughly articulated salient characteristics of the instruments (e.g., accessibility, vibrotactile response), Matney's more recent work (in press) tended to described functions as general outcome areas. This difference in therapeutic function descriptions may have in part occurred due to the earlier publication employing books, personal clinical experience, and other materials outside of peer-reviewed journals. Both lists, however, provide a foundational understanding of intervention theories that have been employed across populations and settings. Current research trends suggest the importance of further study, using rigorous methods that seek to take into account effectiveness, impact, complexity, and context.

Literature Reviews Regarding Music Instruments in Therapy

Researchers have analyzed literature in order to better understand the use of particular instruments in therapy. Krout (2007) reviewed literature specific to guitar use in therapy between the years 1966 and 2005. He described such literature in relation to populations and the therapeutic needs of motivation, preference, and choice. Results suggested an increased use of guitar over time by decade of publication, and an increase of guitar use with younger-aged populations over time by decade. Matney (2004) conducted a content analysis on the use of percussion in therapy between 1980 and 2004, and subsequently created a manual for teaching percussion to music therapy students based on the information gathered in this content analysis. Results included a set of therapeutic function and therapeutic application themes, describing the communications that inform how and why music therapists use percussion in their work. Petersen (2012) performed a literature review on rhythm as an intervention tool. He described the use of percussion to employ rhythm within interventions. However, the review of percussion was a limited portion of the overall study. While each of these literature reviews has contributed to the body of literature, none focused on effectiveness of intervention outcomes, or the theories related to such outcomes.

More recently, Matney (in press) conducted a content analysis of 580 peer-reviewed articles that discussed the use of percussion in therapy. Results suggested that (a) there has been an increase in articles over time by decade; (b) authors have employed a broad range of methodologies over time, with an increase in more rigorous methods within the last fifteen years; (c) percussion has been used with an array of populations, with mental health-related populations being predominant; (d) a wide variety of percussion instruments are mentioned, with a focus on drums and auxiliary percussion; (e) many therapeutic techniques have been employed; and (f) twelve primary therapeutic function themes appeared in the literature. The

results of this study may inform a better understanding of the many contexts within which percussion has been used for therapeutic purposes. However, the author's analysis did not directly examine intervention effectiveness, or intervention mechanisms that promote such effectiveness.

Clinicians therefore commonly use percussion in their work, as noted by the current body of literature (Matney, in press; Scheffel & Matney, 2014). However, clinicians' descriptions include a broad range of uses for various outcomes. Furthermore, researchers employ an array of research methodologies. This diversity of music therapy methods, research methodologies, and outcomes connotes percussion in therapy as a complex process. To date, there appears to exist no study that has attempted to examine this complexity in order to ascertain how and why percussion use is *effective* in therapy.

The investigator for this study is a percussionist with more than 25 years of experience, a music therapist with 14 years of experience, and a university educator with ten years of experience. The investigator has used percussion effectively in clinical practice, and has taught courses specific to percussion in music therapy. For these reasons, the investigator holds an interest in better understanding the potential of percussion use in therapy for effective outcomes.

If music therapy is an evidence-based practice that seeks to promote effective outcomes, then percussion-related music interventions should also be based in evidence, and should also seek to promote effective outcomes. Clinicians, educators, researchers should be able to promote effective intervention processes. Most importantly, stakeholders should be able to rely upon intervention processes that promote health. This study therefore seeks to better understand the ways in which particular outcomes may be effectively promoted in specific contexts.

The Value of Literature Reviews

Music therapy publications and associations have emphasized evidence-based practice in order to demonstrate beneficial outcomes, as well as to show how and why those outcomes impact clients and communities. Music therapy researchers may implement a broad range of literature review types in order to answer diverse questions about outcomes, both in general and more specifically related to percussion interventions. The choice of literature review type should be able to appropriately answer the research questions.

Chalmers, Hedges, and Cooper (2002) stated "Science is supposed to be cumulative, but scientists only rarely cumulate evidence scientifically" (p. 12). This quote succinctly identifies a problem that writers of comprehensive literature reviews seek to resolve. Where individual studies focus on the effectiveness or meaning of a particular intervention in a specific context, a review of such studies provides an encompassing overview as to a more generalizable effect, and may also discuss how or why the intervention is effective. Therefore, progress not only requires the scientific process in order to promote rigor in a singular study; it also requires a high level of rigor when analyzing, interpreting, and synthesizing multiple studies. Authors recognized this need as far back as the 18th century, but the elevation of rigor, through a range of literature review types, appears to have occurred with more consistency within the last three decades (Chalmers et al., 2002). The purpose of this study is to conduct a realist synthesis-type systematic review of the literature regarding the use of percussion in therapy.

CHAPTER II

Understanding Literature Reviews

Researchers have developed and evolved a wide range of literature review types in order to address particular needs. Authors have also categorized and differentiated literature review types to varying levels of agreement. The broad literature review, being differentiated from the narrow review, includes two dichotomous types: the traditional review, and the systematic review. Authors have not reached consensus about categorizing particular review subtypes, resulting in a third category: disagreed-upon types. Multiple subtypes of literature exist within each of these three categories. This chapter will (a) define literature reviews; (b) articulate the categorization of literature review types and subtypes as based in current literature; and (c) describe and justify the use of the realist synthesis-type systematic review for this study.

Defining Literature Reviews

The term "literature review" refers to a set of similar-yet-distinct processes, each focusing on past literature in order to inform a current research need. A literature review may be categorized as either narrow or broad in scope. Most researchers write literature reviews in the narrow sense, meaning as a review that builds evidence related to a particular study. Cooper (1998) described the function of this narrow type: to "address theoretical works and empirical studies pertinent to the specific issue addressed by the new study" (p. 3) (e.g., reviewing past case studies on a particular intervention before conducting a randomized controlled trial). Hanson-Abromeit and Sena Moore (2014) defined the narrow literature review type as a "brief overview of primary sources to introduce an original empirical research report to provide background and rationale for a specific research project" (p. 6). This narrow type does not act as the primary focus of a study, but rather functions to (a)

provide a foundation of evidence for a study, (b) identify problems or missing information in the literature, and (c) help compare findings from other studies to the researcher's results (Hanson-Abromeit & Sena Moore, 2014, p. 6).

Broad literature reviews differ from the narrow literature review type. Cooper (1998) stated that broad literature reviews "can focus on research outcomes, research methods, theories, applications, or all of these" (p. 3). Onwuegbuzie, Collins, Leech, Dellinger, and Jiao (2010) defined a broad literature review as an "interpretation of a selection of published and/or unpublished documents...that optimally involves summarization, analysis, evaluation, and synthesis of the documents" (p. 173). The general category of broad literature reviews becomes more specified when the researcher considers theoretical factors (e.g., the epistemological presuppositions) and logical factors (e.g., the most efficient way to answer a particular research question).

Categorizing Literature Review Types

Researchers have discussed many different subtypes of broad literature review. The investigator located seventeen different subtypes. Authors have occasionally categorized these subtypes of broad literature review into two dichotomous types: "traditional" or "non-systematic" reviews and systematic reviews (Downer, Moles, & Speight, 2004; Gough, Oliver, & Thomas, 2012; Hanson-Abromeit & Sena Moore, 2014; Khan, Kunz, Kleijnen, & Antes, 2011). However, with particular review subtypes, authors either appear to disagree about categorization, or use unclear language regarding how to categorize. This lack of consensus and clarity requires further examination. Regardless, authors do appear to agree about particular literature review subtypes as either traditional or as systematic. The intention of the remainder of this chapter is to describe the array of broad literature review subtypes that exist, using the following categories: (a) traditional or non-systematic reviews, (b)

disagreed-upon literature review types, and (c) systematic reviews. Each of these review types and related subtypes are summarized in Table 1. The table also includes advantages and disadvantages to each review subtype.

Table 1

Broad Literature Review Types and Subtypes by Category: Description, Advantage, and Disadvantage

Traditional Literature Reviews			
Subtype	Description	Advantages	Disadvantages
Content Analysis	studies the content of recorded human communication	• flexible methodology • heterogenous articles	• severely limited ability to examine outcomes • limited ability to develop theory
Narrative Review	comprehensive literature review	• demonstrates authors expertise on a topic	• severely limited ability to synthesize outcomes • theories may be discussed, but not synthesized
Theoretical Review	critical analysis of theory on a particular topic	• facilitates theory development that may inform frameworks	• relies upon a homogenous topic • not necessarily specific to theory development for interventions
Disagreed Upon Literature Review Types			
Subtype	Description	Advantages	Disadvantages
Meta-ethnography	synthesis of ethnographic research	• promotes integration of interpretive studies • can inform theories and intervention reporting regarding impact on clients	• Can not analyze quantitative findings; study types are homogenous in nature
Integrative Review	integration of literature on a phenomon or problem	• informs theoretical frameworks and perspectives through literature integration • flexible in relation to inclusion of various methodologies	• Not specific to locating mechanisms of change that occur in interventions

Table 1 (continued)

Systematic Reviews			
Subtype	Description	Advantages	Disadvantages
Stand-alone Systematic Review	synthesis of results related to clinical practice, research, or policy	• focus on primary research studies with emphasis on quality to better understand outcomes and theories behind them	• Tendency to be limited in scope of methodologies reviewed • Not specific to locating mechanisms of change that occur in interventions
Meta-analysis	combines the statistical results of multiple studies for a more generalized understanding of clinical efficacy	• Strengthens understanding of intervention efficacy	• Limited scope of methodologies to analyze • Can only report outcomes, not theoretical frameworks behind them.
Cochrane Review	collective systematic review using established methods to examine outcomes	• Increased strength through use of multiple reviewers • Increased consistency in methodology due to established method	• Outcome focus does not examine or build theory related to outcomes.
Narrative Synthesis	synthesis of results based on words and text to describe how and why an intervention is effective	• Focus on theory development. • Can include varying methodologies to substantiate results. • Transferrable to policy.	• Focuses on a particular concept or intervention in a way that may not lend itself to diverse uses of music interventions with diverse populations.
Meta-synthesis	analysis and synthesis of qualitative studies	• promotes configuration of larger themes surrounding a phenomenon • can promote an understanding of client impact and meaning	• limited to qualitative methodologies
Meta-narrative Review	compares and contrasts philosophies of science as applied to a particular health care event	• provides an understanding of similar or differing intervention theories from philosophical and historical perspectives • can inform theory development	• overview of varying theories may lack specificity in relation to particular interventions

Table 1 (continued)

Systematic Reviews			
Subtype	Description	Advantages	Disadvantages
Mixed-methods Systematic Review	synthesis of multiple methodologies by using diverse integrative methods	• promotes inclusion of various methodologies • can inform understandings of efficacy and impact in a way that may influence policy • use of qualitative methodologies may inform theory	• does not necessarily provide a specific focus on theory development, particularly in relation to mechanisms of change
Meta-reviews	synthesis of other systematic reviews on a particular topic	• can provide robust information about an intervention due to the extensive amount of studies included • can examine different types of systematic reviews	• requires a topic that has been extensively studied • limited in terms of contextual description
Meta-epidemiology	type of meta-review that focuses on origins, incidences, and distribution of health-related issues	• promotes understanding of how particular health care issues manifest and spread	• narrow focus • limited use
Critical Interpretive Synthesis	development of theory through examining quality of theoretical frameworks	• promotion of theory development • only study type that explicitly analyzes theory quality as part of methodology	• new methodology may benefit from refinement • limited to topics with developed theoretical frameworks.
Framework Analysis	theory development through qualitative data analysis	• flexible for either a single study or multiple studies	• specific to qualitative studies
Best-fit Framework Synthesis	theory development: adapts Framework Analysis to a particular research question	• flexible for either a single study or multiple studies	• specific to qualitative studies
Realist Synthesis	development of theory by examining the relations between context, mechanism, and outcome as related to interventions	• inclusive of a diverse range of methodologies • establishes specificity for mechanisms of change by analyzing the contexts with which those mechanisms work or do not work	• newer methodology may benefit from refinement

Traditional or Non-systematic Literature Reviews

Researchers have consistently noted that particular types of broad literature review are not "systematic reviews." Traditional reviews do not focus on research questions of effectiveness or impact of an intervention. Traditional reviews do not appraise study quality for eligibility, nor do they explicitly seek to synthesize studies in relation to outcomes. These review subtypes, include (a) content analysis; (b) narrative review; and (c) theoretical review. These have been consistently described as traditional or non-systematic.

Content analysis. Researchers have provided similar definitions for content analysis over time. Providing an early and focused definition, Kaplan (1943) stated, "content analysis is the statistical semantics of political discourse" (p. 230). Kaplan appears to have been referring to the frequency of word use in rhetoric and philosophical writing. More recently, Babbie (2010) described content analysis as a methodology that studies the content of recorded human communication. Content analysis allows an investigator to analyze large amounts of information in order to answer particular research questions related to discourse. Holsti (1969) noted three purposes of content analysis: (a) to describe trends in communication content, (b) to compare content to standards, and (c) to describe patterns of communication.

While some researchers note that the field of origin for content analysis is unknown (Hanson-Abromeit & Sena Moore, 2014), the written history of the method suggests association with hermeneutics, psychology (Rust, 1983), sociology (Glaser & Strauss, 1967), and the grounded theory approach (Crotty, 1998). Berelson (1952) wrote the first book on content analysis. He provided a set of uses for content analysis, including the description of trends and patterns. These uses appear to be common in health-oriented research.

Health care researchers have used content analysis methods to answer particular questions. Schmidt, Raque-Bogdan, Piontkowski, and Schaefer (2011) studied three journals in order to investigate the inclusion of positive psychology frameworks in articles. Results indicated that approximately one third of all articles from the three journals mentioned positive psychology constructs at least once, but that only three percent of the articles offered a strong focus on positive psychology. The authors organized all terms related to positive psychology and presented them with implications toward current pedagogy and clinical practice. Ramanadhan, Mendez, Rao, and Viswanath (2013) analyzed social media presence

used by 166 community-based organizations (CBO's). Study results suggested that 42% of CBO's used at least one of three types of social media (Facebook, Twitter, and YouTube), with organization promotion being the most common function for social media use. CBO's also tended to not use social media for audience interaction.

Music therapy researchers have conducted content analyses. Gregory (2002) studied behavioral research designs within the *Journal of Music Therapy* over a forty-year period. Jones (2006) evaluated *Journal of Music Therapy* articles that used control groups in research processes. Both the Gregory and Jones studies focused on categorizing particular types of studies. Roberts and McFerran (2008) studied the discussion of music therapy in Australian newspapers and other print media. Their "mixed-methods content analysis" (p. 1, abstract) concentrated, in part, on the role of music and the client in therapy. In the above examples, content analysis contributed to a better understanding of the types of research studies that have been conducted, or to a better understanding of musical function in therapy.

Narrative review. Cipriani and Geddes (2003) defined a narrative review as a traditional approach to literature review that is largely based on an author's expertise on a particular topic. The term narrative review appears to have been used interchangeably with literature review (Cipriani & Geddes, 2003; Uman, 2011). Narrative reviews differ from systematic reviews (including narrative syntheses and meta-narrative reviews) in that they usually lack explicit criteria for selecting and appraising evidence, and rely on experience of the author. In contrast, systematic reviews rely upon the evidence base to formulate results. For this reason, narrative reviews may include selection bias (Uman, 2011).

The term narrative review appears synonymous to the broad notion of a literature review. For this reason, the narrative review does not appear to have a definitive historical origin (Hanson-Abromeit & Sena Moore, 2014). Although historical origins and methodology

appear to be difficult to ascertain, researchers continue to use the narrative review process in research in health care and music. Afshar, Raju, Ansell, and Bleck (2011) reviewed literature that discussed tetanus outbreaks in developing countries that had encountered disasters. Results of the review suggested that people who had suffered injury in disasters receive proper immunizations through either intensive care treatment or through a multidisciplinary team. In relation to music and health, Holmes and Padgeham (2011) reviewed literature on tinnitus, including prevalence, etiology, diagnosis, and treatment. Results of the review suggested ways in which nurses may help assess the individual needs of people diagnosed with tinnitus, including complementary therapies, and noise reduction in medical settings.

Theoretical review. A theoretical review evaluates and compares the theories that explain a particular phenomenon in relation to "breadth, internal consistency, and the nature of their predictions" (Cooper, 1998, p.4). A theoretical review appears synonymous to the term critical review, where theories about an occurrence are reviewed, and then critically analyzed. Hanson-Abromeit and Sena Moore (2014) noted that a theoretical review is for "comparing and contrasting theories on a phenomenon" (p. 10). For example, Goodkind (2013) critically reviewed three theories related to single-sex education for low-income youth of color. Review results suggested that there is no documentation to support the improvement of education through these methods. Furthermore, the three proposed theories fail to address larger needs related to race, sexual orientation, and socioeconomic status. In relation to health care, Carl, Soskin, Kerns, and Barlow (2013) reviewed literature to locate theories on disturbances in positive emotion, in order to propose treatment strategies that promote emotional regulation in clients with emotional disorders. In relation to music, Rohrmeier and Koelsch (2012) critically reviewed theories of prediction and expectation as related to music and neuroscience. Results suggest that, while particular elements of music (e.g., melody) have

been measured in relation to prediction, other elements (e.g., harmony, texture) have not been studied and cannot therefore be assumed to follow prediction theories. Furthermore, music from various cultures contains components in rhythm, form, and harmony that deviate from common predictive patterns, raising questions about the universality of predictability outside of cultural acclimation. The researchers suggest continued computational modeling and further study.

Authors have consistently categorized the above literature review subtypes as traditional or non-systematic reviews. These types appear to have been categorized by consensus according to the literature. Investigators have not reached this type of consensus in categorizing other types of narrow literature review. The next section will focus on these subtypes.

Disagreed-upon Literature Review Types

Disagreements regarding categorization appear to be a common phenomenon, and categorizations regarding narrow literature review subtypes are no exception. In some cases, authors seem to disagree about whether or not a particular methodology is categorized as a systematic review or a traditional review. In other cases, language used to describe review types makes categorization less clear. These particular disagreed and unclear types – meta-ethnography and integrative review - are described below.

Meta-ethnography. Noblit and Hare (1988) defined meta-ethnography as "the synthesis of interpretive research" (p. 10). They argued that meta-ethnography provided a method with which qualitative studies could be reviewed and integrated while also advocating for an interpretation of those same studies. Instead of pooling results, a meta-ethnography seeks to develop an awareness of underlying concepts found within the literature. In other

words, a researcher would use a meta-ethnography to provide a synthesized interpretation of the studied literature.

Researchers appear to disagree about how to categorize meta-ethnography. Chalmers et al. (2002), Gough, Oliver, and Thomas (2012), and Harden (2010) described meta-ethnography as a type of systematic review. However, Hanson-Abromeit and Sena Moore (2014) noted that meta-ethnography did not qualify as a systematic review. The authors did not provide a specific rationale for this exclusion in the article. However, one of the authors did note later that the meta-ethnography information both authors gathered did not fit with their definition of a systematic review (K. Sena Moore, 2/25, 2015). Noblit and Hare (1988), the originators of meta-ethnography, did not specifically use the term "systematic review" in their definitions or descriptions. However, systematic review terminology was not developed enough for Noblit and Hare to offer either a definitive association or a differentiation.

Educational researchers established meta-ethnography as a particular review process in the early 1980s (Noblit & Hare, 1988). More recently, health services researchers have started to explore its applicability for synthesizing qualitative research within health care. Campbell et al. (2003) synthesized seven qualitative studies that each described ways patients with diabetes could be empowered to find balance in their lives. The researchers located six key concepts within the literature: (a) time and experience, (b) trust in self, (c) a less subservient approach to care providers, (d) strategic non-compliance with medication, (e) effective support from care providers and (f) an acknowledgement that diabetes is serious. Adams et al. (2011) studied the experiences and needs of younger women diagnosed with breast cancer, primarily through the use of a meta-ethnographical methodology. In this case, the author used a *reciprocal translation method*. Recriprocal translation exists as an iterative review process that locates and synthesize similar themes between qualitative studies, while

also acknowledging areas of difference. In this study, the author located study themes that included cultural and local contexts, as such might might play a role in the participants' experiences. Findings indicated that young women use the following three processes to deal with their life after diagnosis: balancing, normalizing, and changing.

The investigator could not locate a meta-ethnography specific to the field of music therapy. Given the broad range of qualitative music therapy studies that have been presented in books and journal articles, meta-ethnography may provide researchers a tool with which to synthesize such studies, potentially providing new insights.

Integrative review. The integrative review provides one example of a review type with which the language has made the method unclear. Where Hanson-Abromeit and Sena Moore (2014) categorize integrative review as a traditional review type, Burns (2012) described the process of an integrative review as a "*systematic research synthesis*" (p. 7); this wording risks a lack of clarity regarding the categorization of the integrative review. According to Stevens (2001), the term integrative review predates the term systematic review in the Cumulative Index of Nursing and Allied Health Literature (CINAHL). Stevens' historical description illuminated both the connection and difference between systematic review and integrative review:

> This term (systematic review) was substituted by CINAHL for the term "integrative review." Between the dates 1990 and 1997, the subject heading integrative review captures those literature reviews considered to be evidence summaries (i.e., any variety of methods used to gather evidence across several studies) (p. 536).

Torraco (2005) defined an integrative review as "a form of research that reviews, critiques, and synthesizes representative literature on a topic in an integrated way such that

new frameworks and perspectives on the topic are generated" (p. 356). Broome (2000) stated that an integrative review could seek to summarize research and develop concepts "by drawing overall conclusions from many studies" (p. 47). Whittemore and Knafl (2005) provided the following definition for integrative review: "An integrative review is a specific review method that summarizes past empirical or theoretical literature to provide a more comprehensive understanding of a particular phenomenon or healthcare problem" (p. 546).

Health care researchers have conducted integrative reviews. Bailey et al. (2010) conducted an integrative review regarding the management of breathlessness with clients who have respiratory illnesses. Results suggested that the majority of reviews focused on a small number of pharmacological interventions, and that non-pharmacological interventions, while potentially promising, provide limited conclusions due to the smaller power of individual studies. Bailey and colleagues concluded by stating that non-pharmacological management should be studied further, since some promise is shown and because many non-pharmacological methods do not cause side effects. Within the field of music therapy, Burns (2012) conducted an integrative review in order to assess the delivery of music interventions in oncology. Results suggested that few studies provided rationales for intervention delivery, making fidelity difficult to measure. The author suggested inclusion of theory development in research, in order to promote study rigor.

The prior section discussed the traditional literature review and the disagreed-upon literature review type. The next section begins by examining the history, definition, and intention of the systematic review. Subsequently, the following section will return to a topic of author consensus: that being the agreed-upon systematic review subtypes.

History of Systematic Review Terminology

Historically speaking, researchers have interchangeably used the terms *systematic review*, *integrative review, research synthesis*, *knowledge synthesis*, and *meta-analysis* (Chalmers et al., 2002; Kastner et al., 2012; LoBiondo-Wood, 2014; Stevens, 2001). More recently, authors have provided some clarification among these terms. Chalmers et al. (2002) noted that research synthesis and systematic review are similar, but that "it is uncertain whether use of the former during the pre–World War II period reflected the very structured process that we understand by the term today" (p. 16). The authors instead also noted that the term research synthesis has been "used extensively by the social scientists who led the development of the science and practice of this kind of research over the post–World War II period" (p. 16). However, the term systematic review has increased in popularity, and is commonly used within the literature. According to *A Dictionary of Epidemiology* (Porta, 2008), a systematic review and a meta-analysis are differentiated in the following definition of a systematic review:

> *The application of strategies that limit bias in the assembly, critical appraisal, and synthesis of all relevant studies on a specific topic. Meta-analysis may be, but is not necessarily, used as a part of this process. Systematic reviews focus on peer-reviewed publications about a specific health problem and use rigorous, standardized methods for selecting and assessing articles. A systematic review differs from a meta-analysis in not including a quantitative summary of the results* (Porta, 2008, no page number given).

Hanson-Abromeit and Sena Moore (2014) also hierarchically differentiated meta-analysis from systematic review, noting the use of a "specialized statistical technique that results in an effect size" (p. 11) in order to locate a weighted average effect for the particular intervention

or event. Neither Porta (2008) nor Hanson-Abromeit and Sena Moore (2014) provided a definition for the term research synthesis or knowledge synthesis. Furthermore, recent articles in the medical sciences (Rauh-Hain & del Carmen, 2013), social sciences (Meijer, Röhl, Bloomfield, & Grittner, 2012), and music therapy (Brown & Jellison, 2012; Hanson-Abromeit & Sena Moore, 2014; Sena Moore, 2013) appear to use the term systematic review. Therefore, the investigator for this study will use the term systematic review instead of research synthesis or knowledge synthesis, and will note meta-analysis as a particular type of systematic review that requires statistical analysis methods.

Systematic Reviews

A systematic review exists as a methodical appraisal of studies in that focuses on a particular area in order to address a research question or set of research questions (LoBiondo-Wood, 2014). A systematic review seeks to "report the most current and valid research on intervention effectiveness" (Hanson-Abromeit & Sena Moore, 2014, p. 221), in order to inform evidence-based practice. Researchers have recognized the need to synthesize evidence for more than two centuries (Chalmers et al., 2002). For example, naval surgeon James Lind described the importance of bias removal and cumulative research review in relation to scurvy treatment and prevention in the 18th century (Hampton, 1998). Statistician Legendre developed the method of least squares to assist astronomers in combining numerical data in the early 19th century. Strutt (1885) illuminated the importance of both conducting individual experiments and synthesizing results:

> Two processes are thus at work side by side, the reception of new material and the digestion and assimilation of the old; and as both are essential we may spare ourselves the discussion of their relative importance. One remark, however, should be made. The work which deserves, but I am afraid does not

> always receive, the most credit is that in which discovery and explanation go hand in hand, in which not only are new facts presented, but their relation to old ones is pointed out (p. 20).

As mentioned previously, researchers have defined the systematic review as a standardized, methodical synthesis of a conceptual set of literature in order to answer specific research questions. Systematic review research questions most often inquire about the effectiveness of an intervention or event (Gough, Thomas, & Oliver 2012; Hanson-Abromeit & Sena Moore 2014; Porta 2008). A systematic review requires appraisal of the quality of prior studies, and also requires synthesis of their results (Khan et al., 2011).

Various authors have discussed different sub-types of systematic review. Hanson-Abromeit and Sena Moore (2014) described a systematic review as both a general construct with many sub-types, and as a "stand-alone, methodologically rigorous study that summarizes research evidence based on a clearly formulated question" (p. 6). The authors described the following systematic review subtypes: (a) systematic review (stand-alone), (b) meta-analysis, (c) Cochrane review, (d) narrative synthesis, (e) meta-synthesis, (f) meta-narrative synthesis, and (g) mixed-methods systematic review. Gough, Oliver, and Thomas (2012) also include the review subtypes: (h) meta-reviews (reviews of reviews) and meta-epidemiology (a meta-review that assesses methodological patterns, largely in disease control), (i) critical interpretive synthesis (theory generation based on a systematic process), and (j) realist synthesis (systematic review of context, mechanism, and outcome). Other authors have also discussed (l) framework analysis and best-fit framework synthesis (a particular application of best-fit framework synthesis) (Carroll, Booth, Leaviss, & Rick, 2013; Ward, Furber, Tierney, & Swallow, 2013). These review sub-types appear to differentiate through the following characteristics: (a) employment of a particular method (e.g., the statistical methods related to

meta-analysis), (b) focus on particular types of literature (e.g., meta-synthesis and its focus on qualitative literature) and (c) focus on a particular epistemological stance (e.g., a meta-narrative review and its relationship to Kuhn's "paradigm" (Greenhalgh et al., 2005)). Using considerations of history, categorization, and definition, the author will explain subtypes of the systematic review.

Stand-alone systematic review. Health science researchers have commonly conducted stand-alone systematic reviews. Choudry, Fletcher, and Soumerai (2005) analyzed literature regarding the effect of physician experience on the implemented standard of health care. Results suggested that effective interventions directed at physicians who have been in practice for a long period of time may be warranted, because they may be at risk of providing a lower-quality care. Doherty and Stravropoulou (2012) examined the "factors that support and deter patients to be willing and able to actively participate in reducing clinical errors" (p. 257, abstract). The authors concluded that the patients' illnesses and their fear of being labeled as 'difficult' were the two most prevalent obstacles in their playing an active relational role in the clinical process.

Music therapists have also discussed and performed stand-alone systematic reviews. For example, Brown and Jellison (2012) reviewed music research with children and youth to locate participant characteristics, research purposes, methodologies, and findings related to music and special education. The authors noted that there was (a) a dramatic increase of literature discussing children with autism, (b) an increase in experimental design studies, (c) a lack of generalization measures, and (d) an increase in special education emphasis. Sena Moore (2013) studied articles regarding the neural effects of music on emotion regulation so that findings could be related to music therapy practice. Results indicated that particular musical qualities tend to have particular effects on emotional regulation.

Meta-analysis. Meta-analysis has largely been considered tantamount to statistical synthesis of data. Porta (2008) defined meta-analysis as "A statistical analysis of results from separate studies, examining sources of differences in results among studies, and leading to a quantitative summary of the results if the results are judged sufficiently similar to support such synthesis." Similarly, Thomas, Harden, and Newman (2012) defined meta-analysis as "a statistical method for combining the numerical results of studies" (p. 205).

The purpose of statistical assessment in meta-analysis is to promote a greater understanding of the generalizability of an intervention. Researchers achieve this understanding through locating effect sizes of individual studies, and using statistical analysis to synthesize a more general understanding of those effect sizes. Therefore, proper meta-analysis results in a general understanding of the effect of an intervention.

Before its contemporary use in health care, the statistical development and historical implementation of meta-analysis appears to have originated in gambling, math, and astronomy. Blaise Pascal created a mathematical analysis of games of chance in the 1600s, in order to determine the monetary value of playing those games (O' Rourke, 2007). Pascal's approach provided scientists with the preliminary tools to assess differing observations of phenomenon. In the 1700s, mathematicians and astronomers such as Carl Friedrich Gauss and Pierre-Simon Laplace adopted and evolved some of Pascal's ideas. Airy (1861) later formalized these processes in print in order to contribute to astronomy. However, these concepts and mathematical operations were not employed in the medical sciences until the 20th century (Chalmers et al., 2002; Khan et al., 2011).

According to Chalmers et al. (2002), Karl Pearson published a key paper in the *British Medical Journal* in 1904. In this study, Pearson used statistical analysis to synthesize information from 11 separate studies measuring the effects of a typhoid vaccine. Glass coined

the term meta-analysis, and introduced it in a presidential address in 1976 (Chalmers et al., 2002), as well as in literature form (Glass, 1976). Textbooks also began employing the term (Hedges & Olkin, 1985), differentiating meta-analysis as a particular method that uses statistical analysis to measure an intervention's impact.

Health science researchers have conducted meta-analyses. Bray, Cowell, and Hinde (2011) studied the effect of screening and brief intervention on emergency department and inpatient health care utilization outcomes. Results suggested that current research does not demonstrate significant impact, but that further research needs to be conducted to present conclusive evidence. Virues-Ortega, Julio, and Pastor-Barriuso (2013) analyzed the effect of TEACCH intervention studies on children and adults diagnosed with autism. Results suggested that effects on motor, cognitive, and perceptual skills were of small magnitude, while effects on social behavior and maladaptive behavior were moderate to large. Due to the limited pool of studies, the researchers described this meta-analysis as exploratory.

Music therapy researchers have conducted meta-analyses to measure the impact of different interventions. Dileo (2006) conducted a meta-analysis on 183 studies examining the use of music medicine or music therapy interventions, with results suggesting that effect sizes were significantly greater for music therapy interventions than music medicine on many outcome variables, including pain, well-being, and mood, amongst others. Gold, Solli, Krüger, and Lie (2009) conducted a systematic review and meta-analysis of intervention studies seeking to treat people with mental disorders. Results suggested that music therapy, added to standard care, could significantly improve global state, symptoms, and functioning. Results also suggested that effect sizes increased when sessions increased to 16 or more sessions. Standley (2012) updated her own previous meta-analysis (2002) regarding the use of

music therapy in the neonatal intensive care unit (NICU) setting. Results suggested a significant effect size for particular NICU protocols.

Cochrane review. Porta (2008) described a Cochrane review as a type of systematic review that uses explicitly defined methods and a team of authors. Reviews conducted by individual authors may risk bias, or may risk missing articles related to the topic. A Cochrane review seeks to eliminate these potential errors through collective responsibility, peer review, and collaborative rating during review. The Cochrane Collaboration (http://www.cochrane.org) publishes and maintains these reviews. In some cases, researchers will summarize published findings in peer-reviewed journals.

Cochrane reviews originated in health care (Khan et al., 2011; The Cochrane Collaboration, 2013). Archie Cochrane's *Effectiveness and efficiency: Random reflections on health services* (1972) challenged the medical community to obtain better evidence for their practices, most specifically by critically analyzing and collectively summarizing randomized controlled trials (Starr, Chalmers, Clarke, & Oxman, 2009). Over the last twenty years, the Cochrane collaboration has continued to evolve in their methodology and use of technology to assist in serving health care fields.

Health care researchers from various fields have conducted Cochrane reviews. Van Dalen et al. (2012) examined three randomized controlled trials that measured the effects of a low bacterial diet versus a control diet on the occurrence of infections and infection-related mortality in adult and pediatric cancer patients with chemotherapy-related neutropenia. Results indicated that there was no significant difference, but that there may not be enough evidence with which to measure such an effect. Rueda, Pascual, and Subirana Casacuberta (2011) examined quasi-randomized and randomized clinical trials to determine the effect of non-invasive interventions on improving well-being and quality of life in patients diagnosed

with lung cancer. Results suggested that (a) nurse follow-up interventions has demonstrated beneficial effects, (b) counseling evidence on psychosocial symptoms is currently inconclusive, (c) other psychotherapeutic and psychosocial interventions may improve quality of life, and (d) exercise and nutrition interventions have not demonstrated long-lasting benefit.

Music therapists have also completed Cochrane reviews. Mossler, Chen, Heldal, and Gold (2011) reviewed literature regarding the effectiveness of music therapy with people who have been diagnosed with schizophrenia or similar disorders. Results suggested that music therapy with standard care was superior to standard care alone for improving global state, mental state (including negative symptoms), and social functioning. Bradt, Magee, Dileo, Wheeler, and Mcgilloway (2010) researched the effectiveness of music therapy with standard care versus standard care alone or standard care combined with other therapies on gait, upper extremity function, communication, emotions, social skills, pain, behavioral outcomes, activities of daily living, and adverse events on people who had acquired brain injuries. Analysis suggested that Rhythmic Auditory Stimulation may be beneficial for gait improvements with this population, and that all other outcomes were inconclusive at this time.

Narrative synthesis. Popay et al. (2006) defined narrative synthesis as a systematic review approach that "relies primarily on the use of words and text to summarize and explain the findings of the synthesis" (p. 5). They continued by stating that statistical analysis may or may not be included in a narrative synthesis, but that the study must include *how* and *why* an intervention is effective in their summarization, in effect linking process and outcome. Lastly, the researchers stated that narrative synthesis "is one of the ways in which the gap between research, policy and practice can start to be bridged" (p. 5). As a form of story telling, narrative synthesis can substantially communicate effectiveness in a way that other systematic review types lack, potentially resonating with stakeholders and policy-makers.

The origin of narrative synthesis appears to remain unclear (Hanson-Abromeit & Sena Moore, 2014). Historically speaking, narrative synthesis has not garnered an evidence gathering process in the same fashion as meta-analysis. For this reason, the Cochrane handbook argued that systematic reviews using narrative synthesis "may be prone to bias" (Popay et al., 2006, p. 6). Popay and colleagues provided a guidance method for narrative synthesis through the following four steps: (a) developing a theoretical model, (b) developing a preliminary synthesis, (c) exploring relationships in the data, and (d) assessing the robustness of the synthesis product. The authors also described tool sets for each of the above steps.

Health care researchers have analyzed problems through narrative synthesis. Schrank et al. (2013) explored the way well-being is measured and conceptualized for people diagnosed with psychosis. The authors (a) suggested that well-being scales used in the literature are not agreed upon, and use disparate conceptual frameworks, (b) proposed a new conceptual framework with which a researcher may more comprehensively and consistently measure well-being, and (c) summarized some of the data regarding the current evidence base.

Music therapists have also used narrative synthesis to contribute to current literature. McDermott, Crellin, Ridder, and Orell (2013) evaluated the effectiveness of music therapy with people diagnosed with dementia. Results suggested that short term benefits for mood and reduction in behavioral disturbance were apparent, but that there was not enough evidence to conclude any long-term benefits.

Meta-synthesis. Khan et al. (2011) defined meta-synthesis as "the synthesis of existing qualitative research findings on a specific research question" (p. 1). Therefore, meta-synthesis acts as a systematic review method that specifically analyzes qualitative studies.

Meta-synthesis originated in health care (Khan et al., 2011). Stern and Harris (1985) appear to have been the first to use the phrase 'qualitative meta-synthesis.' The two researchers were interested in establishing a method for consolidating a group of qualitative studies. Some theorists have debated the value of synthesizing qualitative studies, arguing that reducing rich individual contexts into more general narratives runs counter to the construction of meaning so common in qualitative research. Other theorists have countered, stating that the creation of new narratives through synthesis both increases visibility for qualitative studies and celebrates the constructionist position (Walsh & Downe, 2005).

Health science researchers have employed meta-syntheses to examine particular research questions. Hodge, Horvath, Larkin, and Curl (2012) sought to "identify and describe older adults' perceptions of their spiritual needs in health care settings" (p. 131, abstract) as related to older adults. Five categories emerged from the analysis, including (a) spiritual practices; (b) relationship with God; (c) hope, meaning and purpose; (d) interpersonal connection; and (e) professional staff interactions. Results provide implications for spiritual assessment in health care, in order to provide better overall services to older adults. Bennion, Shaw, and Gibson (2012) examined the experience of age-related macular degeneration (AMD). The researchers highlighted themes related to: "functional limitations, adaptation and independence; feelings about the future with vision impairment; interaction with the health service; social engagement; disclosure; and the emotional impacts of living with AMD" (p. 976). Results of this study provide implications for providing service to people with AMD.

Music therapy researchers have also used meta-synthesis to examine specific qualitative research questions. Solli, Rolvsjord, and Borg (2013) examined clients' experiences of music therapy in health care, as well as "the potential role of music therapy in the development of recovery-oriented service provision" (p. 244). Findings provided four core

categories of experience: (a) “having a good time;” (b) “being together;” (c) “feeling;” and (d) “being someone.” The authors concluded that these themes align with recovery-oriented processes in health care. They also recommended a contextual and strength-based approach to music therapy.

Meta-narrative review. Wong et al. (2013) stated that meta-narrative review is rooted in a constructivist philosophy of science, and “often look historically at how particular research traditions or epistemic traditions have unfolded over time and shaped the ‘normal science’ of a topic area” (p. 6). The researchers also stated that the goal of meta-narrative review is “sense making of a complex (and sometimes controversial) topic area” (p. 6).

The meta-narrative review originated in health care **(**Wong et al., 2013). Greenhalgh, Robert, Macfarlane, Bate, and Kyriakidou (2004) developed the meta-narrative review methodology in order to provide a realist, practical approach to research questions that examined a problem from the viewpoints and assumptions of various professions. Greenhalgh and colleagues also noted the influence of Thomas Kuhn’s ‘paradigm’ on the meta-narrative (Kuhn, 1962); inherent in the review process, differing viewpoints are analyzed and synthesized to produce an overarching viewpoint. Wong et al. (2013) suggested preliminary publication standards for meta-narrative reviews, known as Realist and Meta-narrative Evidence Syntheses: Evolving Standards (RAMESES). The twenty key points for these standards promote transparency, detail, and cohesion.

Health care researchers have conducted meta-narrative reviews. Greenhalgh et al. (2005) sought to locate overarching narrative themes from disparate literature sources. Their search resulted in thirteen meta-narratives, which were then synthesized and discussed. In conclusion, the authors noted the primary importance of the narrative analysis:

> We provisionally conclude that in situations where the scope of a project is broad and the literature diverse, where different groups of scientists have asked different questions and used different research designs to address a common problem, where different groups of practitioners and policymakers have drawn on the research literature in different ways, where 'quality' papers have different defining features in different literatures and where there is no self-evident or universally agreed process for pulling the different bodies of literature together, meta-narrative review has particular strengths as a synthesis method (p. 429).

The above quote illustrates the constructive flexibility of the meta-narrative review, as a way to synthesize different approaches to a particular problem. This investigator did not locate a meta-narrative review related to music or music therapy.

Mixed-methods systematic review. Mixed-methods research refers to a particular process in which researchers synthesize multiple methodologies in order to answer particular questions (Bradt, Burns, & Creswell, 2013). The purpose of a mixed-methods systematic review is therefore to methodically review diverse literature (e.g., randomized controlled trials and ethnography), through the synthesis of diverse methods (e.g., meta-analysis and meta-ethnography). Pearson et al. (2014) provided a useful definition:

> The mixed-methods approach to conducting systematic reviews is a process whereby (1) comprehensive syntheses of two or more types of data (e.g. quantitative and qualitative) are conducted and then aggregated into a final, combined synthesis, or (2) qualitative and quantitative data are combined and synthesized in a single primary synthesis (p. 6).

Harden (2010) elaborated on the purpose of the mixed-methods model:

> The mixed-methods model enables us to integrate quantitative estimates of benefit and harm with more qualitative understanding from people's lives. This integration helps determine not only the effects of interventions but also their appropriateness (p. 8).

In Harden's view, the mixed-methods approach to systematic review allows for researchers to more thoroughly answer research questions and enhances the utility and impact of the study. Pearson et al. (2014) provided a similar conclusion: "By including diverse forms of evidence from different types of research, mixed-methods reviews attempt to maximize the findings—and the ability of those findings to inform policy and practice" (p. 5).

Researchers appear to agree that any mixed-methods process, including a mixed-methods systematic review, must do more than present the results of multiple methods. Pearson et al. (2014) stated "A search of literature reveals numerous articles claiming to encompass both quantitative and qualitative data analyses; however, few of these can be considered mixed-methods in that included data are rarely combined in a single synthesis nor united in a secondary 'final' synthesis" (p. 6). Bradt et al. (2013) noted that "simply collecting quantitative and qualitative data and reporting the results separately without integration through merging or connecting the data does not meet mixed-methods research criteria" (p. 125); the authors then illustrated the ways that this final synthesis of data can occur.

Over the past 30 years, book and journal publications for mixed-methods research in general have increased in number. Policy-making and grant-funding institutions have also increasingly recognized the value of mixed-methods research (Bradt et al., 2013). More specific to systematic reviews, Hanson-Abromeit and Sena Moore (2014), as well as Harden (2010), noted that the mixed-methods systematic review originated in health care. Pearson et

al. (2014) offered a specific guide with which to conduct mixed-methods systematic reviews. Within this guide, authors note the continuing development of mixed-methods systematic review processes:

> Methods for mixed-methods reviews are still emergent: there are a number of approaches described in literature, and most emerging methodologies focus on pooling the findings of quantitative and qualitative inquiry. The JBI (Joanna Briggs Institute) methodology for mixed-methods reviews is designed to bring together the results of single method reviews (including quantitative, qualitative, economic, diagnostic, etc.) on a given topic (p. 5).

Health care researchers have conducted mixed-methods systematic reviews. Wang and Yeh (2012) described how adults with type-two diabetes explained their own resistance to insulin. Of the 16 studies included in the review, seven used interview methods, five used descriptive methods, and four used quantitative methods (psychometric analysis of data measuring resistance to insulin). The authors used thematic synthesis, resulting in 15 descriptive themes. The authors concluded that people describe many complex reasons for being resistant to insulin, and that medical staff should assess these potential barriers and seek to educate patients beginning insulin treatment.

The investigator did not locate any mixed-methods systematic reviews related to music or to music therapy. Bradt et al. (2013) described the mixed-methods research process in general, but did not specifically discuss mixed-methods systematic reviews.

In addition to systematic review types commonly represented in Hanson-Abromeit & Sena Moore (2014), the investigator located four additional types in the literature: (a) meta-reviews and meta-epidemiology, (b) critical interpretive synthesis, (c) framework analysis and

best-fit framework synthesis, and (d) realist synthesis (Carroll et al., 2013; Gough, Oliver, & Thomas, 2012; Ward et al., 2013). Descriptions of these four additional review types follow.

Meta-reviews and meta-epidemiology. Meta-reviews evaluate and synthesize information found in other systematic reviews (Gough, Thomas, & Oliver, 2012). Meta-reviews may assess sub-reviews of similar methodologies, or may assess mixed methodologies. According to Gough, Thomas, and Oliver (2012), meta-epidemiology is a type of meta-review that seeks to better understand patterns of incidence and distribution of health related issues, such as disease occurrence.

Health care researchers have undertaken meta-review processes. Harald and Gordon (2012) analyzed systematic reviews about depression between 2010 and 2011 in order to locate and organize depressive subtypes. The authors identified five molars of 15 subtypes. Results provide information that may facilitate more specific diagnoses. Matjasko et al. (2012) examined reviews related to youth violence prevention programs. Results suggested moderate program effects on an outcome that can have important economic and social impact on communities.

Critical interpretive synthesis. Critical interpretive synthesis (CIS) exists as a more recently developed systematic review type that focuses on theory development. Gough, Thompson, and Oliver (2012) defined CIS as a method that "generates a coherent and illuminating theory of a body of evidence that is based on a detailed critical study of the theoretical contribution of the evidence" (p. 258). Paramount to CIS is the inclusion of the reviewer's voice as a critical guide. CIS focuses on inclusion and exclusion criteria related to theoretical quality of studies, rather than methodological quality.

Critical interpretive synthesis originated in the twenty-first century. Mary Dixon-Woods and colleagues proposed CIS (Dixon-Woods et al., 2006), largely as an outgrowth of

meta-ethnography, grounded theory, and critical theory. The original CIS study assessed access to health care as related to the candidacy. Results suggested that the innovation of this study type allowed for theory generation as to how and why health care was or was not accessible.

This relatively new review method has also been conducted in relation to music and health. McFerran, Garrido, and Saarikallio (2013) analyzed literature regarding music and adolescent health, with a particular focus on depression. The authors developed a framework that analyzed the theoretical constructs of the studies. Results suggested that current literature has been theoretically oriented towards simplistic, dichotomous ways of thinking about music and adolescent mental health.

Framework analysis and best-fit framework synthesis. Framework analysis exists as a method for qualitative data analysis. The method can be used both during and after data collection, and can therefore be applicable to a particular study or for analysis of multiple studies. Ward et al. (2013) stated that framework analysis "borrows principles from different epistemological traditions in the social sciences field" (p. 2425), and continued by noting that the flexibility of the method is one of its great strengths. Framework analysis consists of five stages: (a) familiarization through immersion in the data, (b) developing a theoretical framework by identifying recurrent and important themes, (c) indexing and pilot charting, (d) summarizing data in an analytical framework, and (e) synthesizing data by mapping and interpreting.

Social policy researchers in the UK developed framework analysis (Ritchie & Spencer, 1994; Ritchie, Spencer, & O'Connor, 2003). Health care researchers have increasingly used the analysis method. For example, Tierney et al. (2011) used framework analysis within a qualitative interview study in order to better understand why people with

heart failure do or do not participate in physical activity. Results suggested that fluctuating health, personal mental outlook, expectations of others, and environmental factors each played a role.

Best-fit framework-based synthesis is a systematic review subtype that focuses on theory development and thematic review by adapting framework analysis to a particular research question (Carroll et al., 2013; Dixon-Woods, 2011). "Best fit" refers to the creation of inclusion criteria specific enough to directly answer the chosen research question or questions. Carroll et al. (2013) described the steps of framework synthesis: (a) systematically identify relevant studies in accordance with the research question; (b) generate a priori theory and appraise quality of studies; (c) code evidence, (d) create new themes through thematic analysis; (e) produce a new framework with developed themes; and (f) revisit literature to explore new relationships and to synthesize a new model.

Outside of the above descriptive articles, the investigator did not locate peer-reviewed literature specific to framework synthesis. Carroll et al. (2013) recently updated this review type in a fashion that will likely promote its use.

Realist synthesis. Researchers use the realist synthesis process when they seek to discern what works for whom in what environment. Gough, Oliver, and Thomas (2012) described *realist synthesis* as a type of systematic review that seeks to understand how and why an intervention works (or does not work) by looking at the connection between a context, a mechanism, and an outcome (CMO) (p. 43). Pawson, Greenhalgh, Harvey, and Walshe (2004) introduced the realist synthesis model in order to address the design and implementation of services covering a "multiplicity of goals" (p. iii). The authors continued: "The hard slog of realist synthesis is about building up a picture of how various combinations

of such contexts and circumstances can amplify or mute the fidelity of an intervention theory" (p. iii).

Health care and other researchers have used realist synthesis to examine various phenomena. Leeman et al. (2010) synthesized interventions that promote individuals with HIV adhering to antiretroviral therapy. Results suggested that confidentiality protocols, flexible scheduling, and strong rapport with the interventionist as well as extended experience with antiretroviral therapist, promoted adherence.

Kane, Gerretsen, Scherpbier, Poz, and Dieleman (2010) conducted a realist synthesis of randomized controlled trials regarding the performance of community health workers that provided child health interventions in low and middle income countries. Results suggested that community health workers performance of intervention implementation improved when there was (a) anticipation of being valued by the community, (b) a self-perception of improved social status, (c) a sense of relatedness with beneficiaries, and (d) assurance that there was back-up support. In the case of both these studies, mechanisms included interactive and relational components.

Prior sections have therefore discussed three narrow literature review types – traditional, disagreed-upon, and systematic – and their many related subtypes, in order to locate a subtype that addresses the needs of the current study. The realist synthesis systematic review subtype is warranted for this study for multiple reasons.

- Realist synthesis accommodates multiple methodologies at one time, which is necessary for analyzing the literature on percussion in therapy.
- Realist synthesis can analyze multiple outcomes, which is necessary for analyzing the literature on percussion in therapy.

- Realist synthesis takes into account multiple contexts, which is necessary for a study topic that includes many populations and many settings.
- Realist synthesis exists as a theory-building methodology. While prior articles and research on percussion and therapy have communicated functions and applications, the realist synthesis directly examines how and why an intervention works or does not work by connecting contexts and outcomes with mechanisms. Realist synthesis therefore can help in establishing theoretical frameworks through the location of mechanisms.

Components of Systematic Reviews

As detailed above, many authors have differentiated systematic review types by giving them categorical names (Downer et al., 2004; Gough, Oliver, & Thomas, 2012; Hanson-Abromeit & Sena Moore, 2014; Khan et al., 2011). Even though the histories and respective apparatus of review types play an important role in differentiation, these *categories* can imply a "top down" approach to understanding systematic review. Other authors have described components of systematic reviews that allow a researcher to *construct* from the "bottom up" (Gough & Thomas, 2012). The researcher may find utility in both categorical and constructive operations. Gough and Thomas (2012) described systematic review components as follows: (a) aggregation and configuration, (b) interpretation and innovation, (c) homogeneity and heterogeneity, (d) types of data, (e) role of stakeholders, and (f) the review question. The authors stated that aggregating reviews "predominately add up (aggregate) the findings from primary studies to answer a review question" (p. 51). Configuring reviews "predominately arrange (configure) the findings from primary studies to answer the review question" (p. 51). The authors clearly state that these differences "do not simply reflect the standard qualitative/quantitative paradigm divide in different words, but also represent genuine

differences in how to conceptualize the activity of synthesis" (p. 53). Configurative and aggregative reviews exist on a continuum, and any particular study may use both types of synthesis to varying degrees. For example, a meta-analysis that uses a regression to examine the impact of interventions on different population groups is configuring results in order to compare and contrast different population samples (p. 53). A phenomenological study may add up participant contributions as a way to locate emerging themes, and therefore inform an understanding of the essential, lived experience. Thus, the researcher can understand aggregation and configuration as components with which to build a singular study method. The researcher chooses aggregative and configurative methods based on (a) the research questions, (b) the type of information being reviewed, and (c) the researchers ontological and epistemological presuppositions (Gough & Thomas, 2012).

Theoretical Frameworks and Knowledge Frameworks

Music therapy authors have discussed the importance of developing and reporting theory that informs the intervention in any particular study. For example, Robb (2012) encouraged researchers to move away from an outcome-based approach towards a theory-based approach. In other words, research has been undergoing a shift: from understanding *if* an intervention has worked, to understanding *how* or *why* an intervention has worked. Robb referred to all research types, and provided theoretical examples related to an experimental study. Burns (2012) suggested that intervention theories (e.g., perception, neuroscience, indigenous) that described change mechanisms would increase rigor and enhance the possibility of application to clinical practice. Both of these authors focused on the theoretical framework that informed the intervention, but did not provide a set of guidelines with which to articulate philosophical and theoretical presuppositions that inform the study methodology itself.

Other music therapy authors have alluded to the importance of theory in relation to study methodology. Aigen (2008) noted that many music therapy articles did not clearly report their respective methods, methodologies, and epistemological frameworks. Edwards (2012) agreed, but also asserted that this challenge was common within many health care fields. She therefore recommended that researchers include, in part, the following when reporting a study: (a) methodology, (b) epistemological foundations, (c) personal position of the researcher, and (d) data analysis process in relation to epistemological stance. The assessments and recommendations provided by Aigen (2008) and Edwards (2012) referred specifically to qualitative research methodologies. Each of these articles has provided valuable information that can be applied to any study type, yet none have directly referred to systematic reviews.

Authors of social research publications have also described the need for more detailed reporting of theory that informs research methodologies. For example, Crotty (1998) proposed a four-level *knowledge framework* (Feast & Melles, 2010): (a) epistemology; (b) theoretical perspective; (d) methodology; and (e) methods. Also, in instances where applicable, Crotty (1998) noted that ontology and/or axiology should also be discussed. Each of these knowledge framework levels warrants further discussion.

Epistemology and ontology. Epistemology and ontology exist as two different, but connected, branches of philosophy. Epistemology focuses on questions related to how we know what we know. An epistemological position grounds a research study by asserting "the nature of knowledge, its possibility, scope, and general basis" (Hamlyn, 1995). Epistemological positions exist on a continuum. The two polar epistemological positions include pure objectivism (knowledge received by the subject from the objective world) and pure subjectivism (knowledge imposed on the world by the subject). Constructionism

(knowledge constructed through interactions between subjects and objects) describes the epistemological stance situated within the center of the continuum (Crotty, 1998). The researcher employs an epistemological stance whether he or she acknowledges or describes such within a methodology. For example, a traditional randomized controlled trial study, which has its roots in positivism, operates nearer the objectivist position. However, a researcher may undertake epistemological positions that are slightly more or slightly less constructive, depending on his or her theoretical perspective (e.g., logical positivism versus post-positivism). A phenomenological research study might operate under a more objectivist epistemology, focusing on the "things themselves," (Edmund Husserl, 2001, p. 168), or may employ a more constructionist position via Martin Heidegger (2008) and Maurice Merleau-Ponty (2013), who focused more so on the lived human experience. A grounded theory study may also be approached from various positions on the continuum. Epistemological transparency benefits the researcher because it helps to frame the way that research questions are asked and answered. Such transparency also benefits consumers, because it helps them to better understand and connect with the knowledge frameworks that inform the study.

Authors have also discussed the importance of epistemology in systematic review research. Gough, Oliver, and Thomas (2012) stated that the systematic review could use multiple epistemological positions within the same study at different times. Two reasons appear to exist for this possibility. First, the studies being reviewed may have employed different epistemologies, which need to be taken into account. Second, the research questions may require multiple epistemologies. Third, the components chosen (e.g., aggregation and configuration) may imply multiple epistemologies in their own respective operations. For this reason, any overarching epistemology presented by a researcher should be understood as a

heuristic with which all stakeholders can engage with, and be critical of, the study process (p. 40-42).

Crotty (1998) also noted that, while epistemology is the primary link to describing how we know what we know, a researcher should include ontological presuppositions in those instances where such also informs the study. The author defined ontology as "the study of being. It is concerned with 'what is,' with the nature of existence" (p. 10). Ontological (being) and epistemological (knowing) presuppositions can interact and inform each other. Therefore, communication of both can magnify the transparency of the study process. Some social researchers appear to have misunderstood the difference between these two branches of philosophy. For example, Guba and Lincoln (1994) posit a necessary link between realism (an ontological position in which objects and events exist independently of the human mind) and objectivism (an epistemological position in which the *meaning* of an object or event exists independently of the mind). The authors' position may hold true when defining realism through the lens of Plato or Immanuel Kant. However, more contemporary philosophers such as Martin Heidegger, Maurice Merleau Ponty [as cited in Crotty (1998)], Gilles Deleuze (1994), and Manuel Delanda (2006), as well as some social research scholars (Crotty, 1998; Maxwell, 2005; Sayer, 1992) have established entire frameworks aligning a realist ontology with a constructionist epistemology.

Systematic reviews also operate with established epistemological and ontological positions. However, Gough, Thomas, and Oliver (2012) note that knowledge is not always "precisely organized, and it is possible to detect multiple epistemological perspectives within the same study" (p. 41). The authors therefore assert that identification of a single or multiple epistemological position within a study should be treated as a "useful heuristic" (p. 41), to

help the researcher and research consumer think critically about the work in accordance with that particular position.

Theoretical perspective. Within the knowledge framework, theoretical perspective exists as the set of assumptions we bring to our chosen methodology, as informed by our epistemological position. A theoretical perspective is a "way of looking at the world and making sense of it" (Crotty, 1998, p. 8), helping us to understand how we know what we know within a particular study. Examples of theoretical perspectives that are more objectivist include positivism and post-positivism. Positivism views the world as an objective, highly organized system within which causes and effects can be discovered and mathematically understood. Post-positivism views the world through an understanding that any observer constructs some part of their understanding of the world, due to the limited lens that any observer has. Therefore, the post-positivist proposes an amendment to positivism (Crotty, 1998). Some theoretical perspectives that tend to be more constructionist include interpretivism, symbolic interactionism, and contemporary phenomenology. Interpretivism, according to Crotty (1998) "looks for culturally derived and historically situated interpretations of the social life-world" (p. 67). Symbolic interactionism states that meaning and knowledge are derived from the interactions that occur between the meanings that people have for objects, the interactions that people have for each other, and the modifications of interpretation based on those meanings (Crotty, 1998). Although phenomenology began as an examination of the "things themselves" (p. 79), contemporary phenomenological research exists as a systematic documentation of lived human experience (Crotty, 1998). Examples of theoretical perspectives that tend to be more subjectivist include feminism and critical theory. Feminism is a position that focuses on the subjective worldview of women, often seeking to promote equality. Critical theory acknowledges the subjective worldview of the socio-

economically disadvantaged, and challenges power systems that promote economic inequality.

Theoretical perspective may be embedded in the methodology without being explicitly noted. For example, a randomized controlled trial operates under the set of assumptions aligned with either positivism or post-positivism. Positivism asserts that phenomena can be empirically and logically verified, as dictated by the laws of nature and as observed by human beings. This verification process includes cause and effect phenomena. Randomized controlled trials can therefore seek to verify causes and effects through stimulus-response trials. Post-positivism asserts that we can gain understanding through empirical trials, but that there exist limitations to the positivist perspective. Post-positivist thinking asserts that humans play a role in *constructing* scientific knowledge, rather than passively receiving all knowledge through overarching natural laws. A researcher can therefore conduct a randomized controlled trial with a theoretical framework that informs the intervention process. The theoretical framework can be tested, modified as needed, and then re-tested in new studies (Crotty, 1998; Edwards, 2012). Some theoretical perspectives have so greatly informed research processes that they evolved into methodological frameworks. For example, researchers have created phenomenological research designs based on the writings of philosophers. Therefore, a phenomenological theoretical perspective informs the design of a phenomenological methodology.

Writings on theoretical perspective (Crotty, 1998) do not explicitly state how theoretical perspectives relate to systematic reviews. However, systematic review types can be understood as operating under particular theoretical perspectives. For example, a meta-analysis operates under the assumption that numerical analysis approaches an understanding of how the total population responds to an intervention; by extension of the types of studies it

reviews, a meta-analysis employs a positivist theoretical perspective. A meta-ethnography may use an interpretivist theoretical perspective (Crotty, 1998). In other cases, a meta-ethnography may take on a more subjective, critical tone by employing a feminist perspective (Kleinman, 2007). Gough, Thomas, and Oliver (2012) caution that not only can multiple epistemologies and "paradigms" (theoretical perspectives) be employed, but that it is helpful to consider differences between reviews by the degree to which these frameworks apply (rather than whether or not they apply).

Similar to the case of phenomenology, some systematic review types (including critical interpretive synthesis, meta-narrative, and realist synthesis) more explicitly state their epistemological and ontological positions, and therefore find crossover between the theoretical perspective and the research design. For example, the realist synthesis adopts a constructive measure within a realist ontology, in that it asserts the importance of context when measuring intervention effectiveness. Gough, Oliver, and Thomas (2012) described *realist synthesis* as a type of systematic review that seeks to understand how and why an intervention works (or does not work) by looking at the connection between a context, a mechanism, and an outcome (CMO)(p. 43). Pawson et al. (2004) introduced the realist synthesis model in order to address the design and implementation of services covering an array of interacting factors that occur in different contexts. The authors continued, "The hard slog of realist synthesis is about building up a picture of how various combinations of such contexts and circumstances can amplify or mute the fidelity of an intervention theory" (p. iii). For this reason, a realist synthesis describes both a theoretical perspective and a methodology.

Authors have described the importance of reporting theoretical perspective in studies. Crotty (1998) stated that researchers should clearly articulate the set of assumptions with which their studies operate, and therefore should elaborate on their theoretical perspective.

This sentiment has also been echoed to some extent within the music therapy literature (Aigen, 2008; Edwards, 2012). Research studies that clearly report the theory underpinning their research design facilitate study replication and clinical transfer.

Methodology. Crotty (1998) defined research methodology as "the research design that shapes our choice and use of particular methods and links them to the desired outcomes" (p. 7). Common examples of research methodology include experimental research, survey research, ethnography, action research, and discourse analysis. Systematic review types equate to systematic review methodologies. These methodologies are then differentiated by the specific methods chosen.

Methods. Methods exist as the set of active tasks that the researcher undertakes to collect, assess, and interpret information. Methods exist as the specific, detailed techniques that researchers use within their methodology to answer research questions (Crotty, 1998). Methods include the types of sampling, data collection, measurements, and interpretive techniques that the researcher employs. Within the systematic review, methods help to establish the sequence of events for the examination of relevant literature, as dictated by the methodology being followed.

Systematic Review Process

Researchers have described the systematic review process in order to facilitate more transparent and more rigorous methodologies (Gough, Oliver, & Thomas, 2012). Hanson-Abromeit & Sena Moore, 2014; Khan et al., 2011). Hanson-Abromeit and Sena Moore (2014) described five major steps in conducting a systematic review: (a) creating the foundation, (b) conducting the search, (c) data extraction, (d) synthesis and analysis of the data, and (e) evaluating the strength of evidence and presenting results. As a systematic review subtype, realist synthesis has followed the same steps. Some types of systematic review allow for

inclusion of heterogeneous study types and an iterative process for theory building, including the mixed-methods systematic review, meta-review, critical interpretive synthesis, meta-narrative review, and realist synthesis. Exclusive to realist synthesis is the explicit emphasis on context, mechanism, and outcome.

Summary, Conclusions, and Purpose Statement

The field of music therapy currently promotes evidence-based outcomes (American Music Therapy Association, n.d.), and transparency when reporting interventions (Hanson-Abromeit, 2015; Robb, et al, 2011). To date, no study appears to have reported a systematic review of the literature regarding the use of percussion in therapy in a way that evaluates outcomes. Furthermore, no study appears to have attempted to comprehensively assess the contexts or mechanisms with which these outcomes have occurred through. Literature regarding the use of percussion in therapy has described an array of intervention types, using different instrumentation with a broad range of populations, therefore suggesting great diversity. Furthermore, these studies are framed in various research methodologies. While Matney (in press) analyzed these interventions in relation to how and why they are used in therapy, the author did not report *if* they were effective. Therefore, he also did not report *how* or *why* they were effective.

The purpose of this study was to conduct a realist synthesis-type systematic review of the literature regarding the use of percussion in therapy in order to answer the following research questions:

1. When using published tools designed to evaluate quality of research, what was the outcome of this appraisal process when reviewing identified studies?
2. What are the context-mechanism-outcome configurations within percussion-related interventions as found through the systematic review process?

CHAPTER III

Method

The use of percussion in therapy appears common in clinical practice (Scheffel & Matney, 2014) and in the body of literature (Matney, in press). To date, no study has sought to comprehensively examine the effectiveness of percussion-based interventions. Furthermore, no study has examined how and why the interventions have been effective. The investigator therefore conducted a realist synthesis systematic review based on general guidelines (Gough, Oliver, & Thomas, 2012; Hanson-Abromeit & Sena Moore, 2014; Pawson et al., 2004; Rycroft-Malone et al., 2012), and the configurative and aggregative components of systematic reviews (Gough, Oliver, & Thomas, 2012). These resources allowed the investigator to address the diverse range of contexts (e.g., settings, populations), intervention types (e.g., improvisation with hand drums), outcomes (e.g., stress reduction, increased communication), and study designs (e.g., experimental studies, thematic analysis studies, mixed-methods studies) found in the literature. While Figure 1 provides visual detail regarding the systematic review process, the following paragraphs also outline the chosen methods.

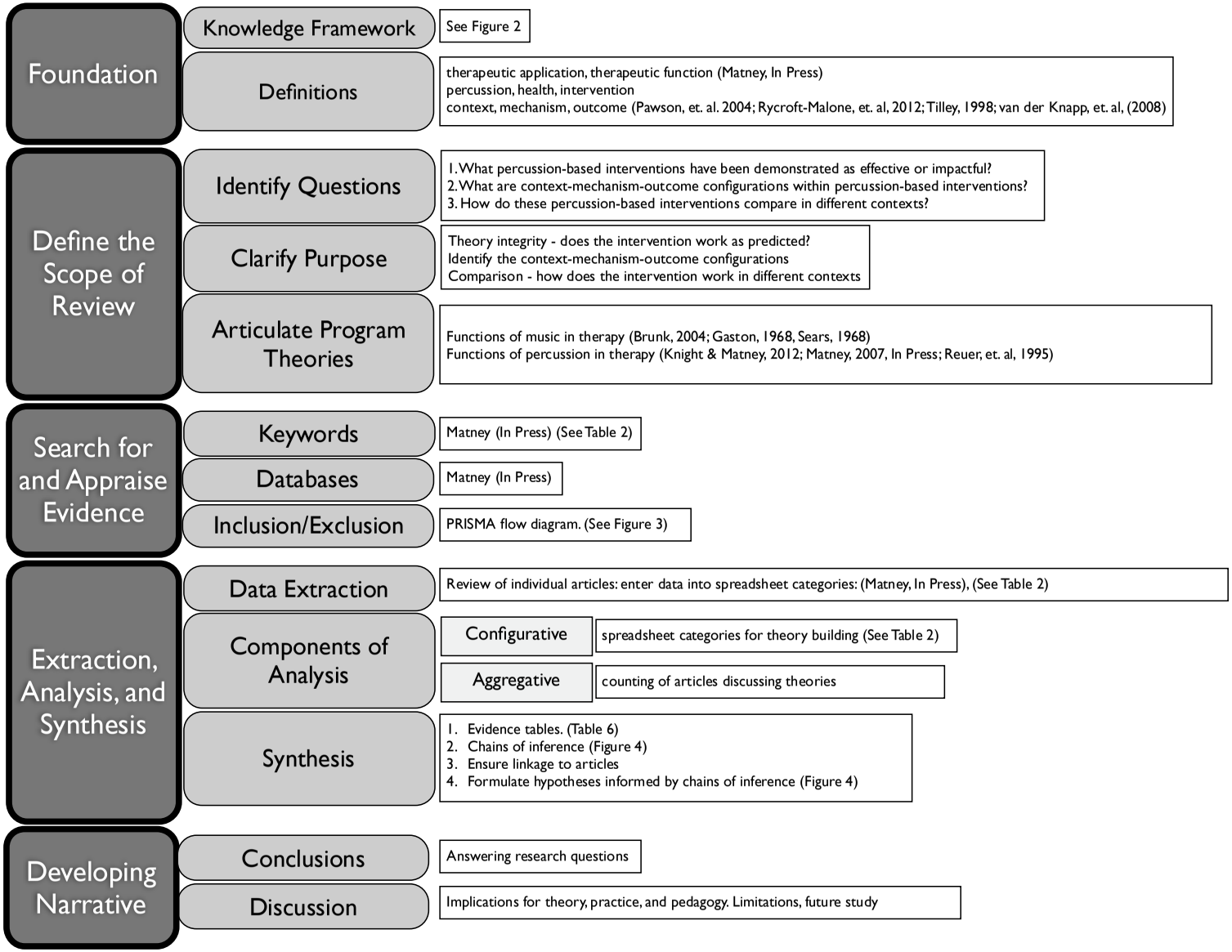

Figure 1. Conceptual Framework for Realist Synthesis Methodology

Building the Foundation

Knowledge framework. The investigator constructed a knowledge framework for this study using Crotty's (1998) four-levels (See Figure 2). The investigator positioned this paper in a constructionist epistemology. The author defined constructionism as the philosophical position that knowledge is created "through our engagement with the realities in our world" (p. 8). Constructionism therefore asserts that knowledge and meaning are generated through interactions between human agency, social frameworks, and material objects. The investigator ontologically aligned the epistemological position with a contemporary understanding of realism. While prior social science authors (Guba & Lincoln, 1994) have asserted that realism and constructionism are incommensurable, other social science authors (Crotty, 1998; Maxwell, 2005; Sayer, 1992) have challenged this notion by relying upon more contemporary assertions of realist ontology. At the root of this challenge exists a set of philosophers who have questioned the classical notion of realism as an absolute reality that is received. Most recently, Delanda (2011) described realism as "the mind-independent existence of reality" (p. 1), and further interpreted such a reality as material, historical, and dynamic. This particular definition of realism lends itself to an emphasis on change through context. Human beings can therefore play a role in altering reality by engaging with it Furthermore, this definition takes into account the individual, social, and material components of the music therapy process.

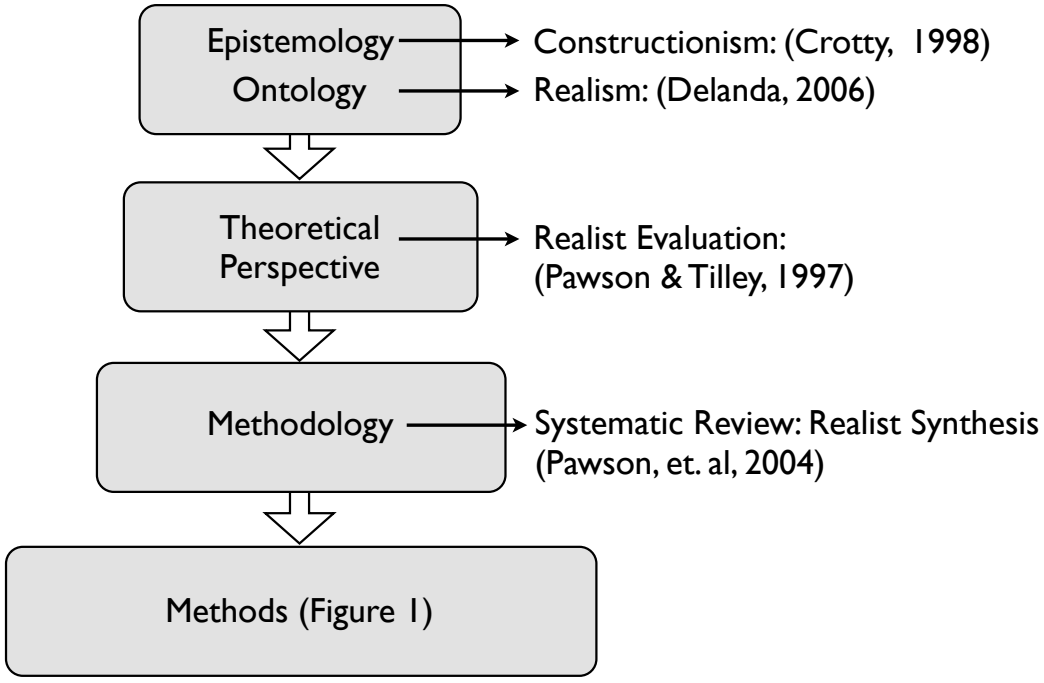

Figure 2. Knowledge Framework

The investigator aligned his process with the *realist evaluation* theoretical perspective. Pawson and Tilley (1997) developed realist evaluation theory as an alternative to models that focus on answering the question "does it work?" In order for interventions to be useful for decision-making and policy changes, the two creators argue that evaluations need to "indicate what works, how, in which conditions, and for whom" (Marchal, van Belle, van Olmen, Hoerée, & Kegels, 2012, p. 194). In this sense, evaluation plays the role of testing theory to understand what, *in reality*, works or does not work in a particular context. Rycroft-Malone et al. (2012) described realist evaluation as a 'logic of inquiry' (p. 9) that provides flexibility for theory development. Interventions are therefore not understood as stimulus-response processes, but rather as a combination of factors that facilitate change. Realist evaluation asserts that interventions are constructed based on the many *real* conditions present in a

particular context. Realist evaluation therefore seeks to locate these conditions, collectively understood as context, in order to better understand how and why a phenomenon produces change (Pawson & Tilley, 1997). The realist evaluation theoretical perspective can therefore align with a constructionist epistemology due to the ability to construct and modify theories for testing. Realist evaluation also can align with a contemporary realist ontology (Delanda, 2011) by allowing for intervention theories to be tested in real, contextual settings.

The investigator chose the systematic review methodology, using the subtype *realist synthesis*. Realist synthesis evaluates an intervention through its contexts, mechanisms, and outcomes (CMO) (Pawson et al., 2004; Rycroft-Malone et al., 2012). These three components help to explain what makes aspects of an intervention effective or ineffective (Tilley, 2000). The investigator operationally defined these components.

The investigator used methods common to systematic reviews, and as described in the realist synthesis literature. The stages of this review included (a) building the foundation, (b) defining the scope of the review, (c) searching for and appraising the evidence, (c) extracting and synthesizing the data, and (d) developing narrative (see Figure 1).

Within realist synthesis, an intervention is theory-driven. Realist evaluation argues that past research models have not taken into account contextual changes that influence how and why an intervention works (or does not work). Therefore, the realist synthesis promotes understanding interventions as context-mechanism-outcome configurations.

Many realist synthesis studies have incorporated policy processes and policy stakeholders into the contextual evaluation, in order to more thoroughly develop theories. While the inclusion of policy could provide fruitful information for music therapy interventions in general, such is beyond the scope of this study.

Operational Definitions

Three terms are explicitly linked to the realist synthesis process: context, mechanism, and outcome. Furthermore, the terms therapeutic application, therapeutic function, percussion, health, and intervention require further clarification, due to their informing the context-mechanism-outcome process. Operational definitions for each of these terms follow.

Therapeutic application. Matney (in press) defined therapeutic application as "how percussion is used" to promote health (p. 3). Prior publications (Knight & Matney, 2012; Matney, 2004) employed the term "therapeutic techniques." However, Bruscia (1998) defines the term technique as "a single operation or interaction that a therapist uses to elicit an immediate reaction from the client or to shape the ongoing, immediate experience of the client" (p. 114). This definition does now allow for the continuous operation of a percussion instrument within a music experience. Therefore, Matney (in press) changed this term to "therapeutic application" in order to clearly articulate the interaction between the therapist, client, and percussion instrumentation; a therapist applies the qualities of the percussion instrument in a particular situation to facilitate an outcome. Therapeutic applications of percussion, as constructed by Matney (in press), included the following:

- Improvisation: extemporaneous musical play
- Accompaniment: use of percussion to accompany another process, such as singing, moving, or someone else improvising.
- Instruction/Performance: lessons, ensembles, and musical performances.
- Technique oriented play: use of a particular technique on an instrument for motor or sensory development.

- Guided interactive play: the use of a game or a structured set of cues to guide the play of percussion instruments.
- Receptive uses: listening to percussion instruments to induce relaxation, altered states of consciousness, or imagery.
- Composition: using percussion to create and score music that may be performed or listened to again.
- Non-musical application: the use of percussion as a tool or prop outside of its creative sound capabilities or affects.
- Play not specified: instances where an instrument is played musically, but how the play is structured is not specified.

Therapeutic function. The author described therapeutic function as the reason percussion instruments are used to promote health. Therapeutic functions in Matney (in press) were related to the intended outcomes, to the particular qualities of the chosen instrument, or to both. Instrumental qualities therefore specifically align with the mechanism, and intended goals with better connection to the outcome. Therapeutic functions identified in Matney (in press) include the following: (a) social, (b) affective, (c) aesthetic, (d) expression, (e) communication, (f) engagement, (g) movement, (h) behavior, (i) sensory, (j) cognitive, (k) awareness, and (l) biological. Each of these functions includes multiple sub-functions, and some sub-functions cross over into multiple functions (Matney, in press).

Percussion. In order to clarify the musical instrumentation being studied, the term percussion also requires definition. Percussion is understood as a set of music instrumentation that most commonly produces sound by being struck, scraped, or shaken. For purposes of this study, percussion instruments can best be understood through the keywords used in the data

search (see Table 2 found on page 65).

Health. For the purposes of this study, health is understood as a state of being that promotes adaptability and efficiency, particularly when facing physical, mental, social, or environmental challenges (Huber et al., 2011). This broad definition of health lends itself well to the variety of outcomes that music therapy and related health care fields seek to promote.

Intervention. The investigator for this study defines an intervention as an effort to promote a beneficial change in health through the use of music and therapist-client interaction. Music therapy interventions not only include the therapeutic function of music (TFM), but also the procedures of therapist effectiveness (Hanson-Abromeit, 2015). These procedures include, but are not limited to: (a) relationship building, (b) prompting, (c) active communicating and listening, and (d) choosing an organized room set up (Bruscia, 1998). An intervention therefore combines chosen elements of music with relational and organizational procedures. The therapist maintains responsibility for these intervention components, even if such includes collaboration with the client to create a unique music experience.

Differentiating Context and Mechanism. An immediate challenge arises in the attempt to separate context and mechanism. Context elements may be material (e.g., whether a client has eaten or not), intrapersonal (e.g., client disinterest), or social (e.g., lack of rapport, institutional regulations, community access). Marchal et al. (2012) proposed that a researcher could "consider context elements as actors or other factors that are external to the intervention" (p. 207), but may have an influence on the outcome. This description of context elements appears similar to the term *covariate*, as commonly used in structural equation modeling and in theory development (Burns, 2012; Hanson-Abromeit, 2015; Robb, 2012). The realist synthesis focuses on theory development by seeking to understand and describe how context elements are present regardless of outcomes, but nonetheless may influence

outcomes.

Defining Context. Interventions occur within a particular context that includes intrapersonal, social, administrative, and cultural components. Pawson et al. (2004) stated that "interventions are embedded in social systems and how they work is shaped by this context" (p. 5). Rycroft-Malone et al. (2012) stated, "The *context* of service delivery is complex, multi-faceted and dynamic, which arguably means that rarely would the same intervention work in the same way in different contexts" (p. 2). For example, a music intervention in an intimate medical setting will likely operate in a different fashion than the same intervention in a group special education setting, due to the contextual differences between the two settings.

The investigator coded context as including details about the participants and the setting. Participant information included diagnosis, age range when reported, and gender frequencies when reported. Setting included facility information and geographic location.

Defining Mechanism. Within realist synthesis, the term mechanism has referred to an established yet non-linear process by which change is brought about (Pawson et al., 2004; Rycroft-Malone et al., 2012). Pawson and Tilley (2004) stated that it is not interventions or programs that work, but it is rather the resources that an intervention or program provides a client that promotes change. The authors therefore suggest that degrees of human agency should be considered a potential mechanism in any intervention. Van der Knapp, Leeuw, Bogaerts, and Nijssen (2008) stated that "mechanisms are the engines behind behavior, which are often not immediately recognizable" (p. 50), suggesting that psychological states or traits may also be potential mechanisms. Astbury and Leeuw (2010) noted that the word mechanism "can mean different things depending on the particular field of knowledge and context in which it is used" (p. 367). For example, some social sciences are more likely to focus on human agency or on social structures. In other cases, social sciences have included

interactions with material components and their salient qualities, while also accounting for individual, social, and institutional structures that influence outcomes. Therefore, mechanisms in this study included material components (e.g., characteristics of musical sound), individual components (e.g., agency, psychological mechanisms), as well as social components (e.g., client-therapist relationship, group dynamics).

The investigator coded mechanism through the following components: (a) theory, which was also described as a prior framework or as a post hoc offering; (b) frequency and duration of intervention; (c) music instrumentation used; and (d) reported method of intervention. Methods included information about group or individual intervention setting, the type of music therapy method used as detailed by the study, and any other procedures of interaction described.

An immediate challenge arises in the attempt to separate context and mechanism. Context elements may also be material (e.g., location of intervention), intrapersonal (e.g., client disinterest), or social (e.g., lack of rapport, institutional regulations, community access). Marchal et al. (2012) noted the general challenge of differentiation between context and mechanism, and proposed that a researcher could "consider context elements as actors or other factors that are external to the intervention" (p. 207), but may have an influence on the outcome. This description of context elements appears similar to the term *covariate*, as commonly used in structural equation modeling and in theory development (Burns, 2012; Hanson-Abromeit, 2015; Robb, 2012). The realist synthesis focuses on theory development by seeking to understand and describe how context elements are present regardless of outcomes, but nonetheless may influence outcomes.

Defining Outcome. An *outcome*, for the purpose of this study, is a demonstrated change in health. Therefore, instead of seeking to understand "what works," the linkage of context-mechanism-outcome (CMO) seeks to answer "what is it about this intervention that works for whom in what context" (Pawson et al., 2004, p. 10). Inevitably, interventions that use music are introduced into multiple contexts. Different contexts may result in different outcomes. *Outcome patterns* encompass both intended and unintended outcomes as they manifest in different settings (van der Knapp et al., 2008). Realist synthesis seeks to understand how interventions work, or do not work, in particular contexts so that outcome patterns can be deduced, and mechanisms can be better explained.

The investigator coded outcomes as described by each study. For experimental studies, all outcomes were categorized and reported as significant or not significant. For qualitative and mixed-methods studies that communicated client meanings related to intervention, outcomes were reported under the impact column in Table 6.

The above definitions for therapeutic application, therapeutic function, percussion, health, intervention, mechanism, context, and outcome inform the study process. This particular study sought to better understand what percussion-based interventions promote health, as well as how they promote health, and why they promote health. The realist synthesis process seeks to achieve this task by locating context-mechanism-outcome configurations in the literature.

Context-Mechanism-Outcome Configuration (CMOC). A CMOC is the articulation of the interaction between the contextual elements and the mechanism (material, theoretical, psychological, and social components) that produces an outcome (Pawson & Tilley, 1997). The CMOC's are articulated for individual studies in Table 6. The synthesized CMOC's are presented in Figure 4.

Defining the Scope of the Review

Identify questions and clarify purpose. Music therapy and other health-care field authors have studied the use of percussion to promote health. These studies have discussed interventions with various populations and within various settings. Investigators have employed an array of intervention types, roughly equated to particular applications of percussion-based methods. Furthermore, authors have used a variety of research methodologies to study these interventions. Therefore, the investigator sought to analyze the literature in order to answer research questions about intervention effectiveness. These questions were answered by detailing the following general processes: (a) evaluating studies using evaluation tools specific to the methodology chosen, (b) identifying context-mechanism-outcome configurations (CMOC's) within studies than demonstrate effectiveness or impact, and (c) synthesizing results regarding CMOC's. The purpose of this study was to conduct a realist synthesis-type systematic review of the literature regarding the use of percussion in therapy in order to answer the following research questions:

1. When using published tools designed to evaluate quality of research, what was the outcome of this appraisal process when reviewing identified studies?
2. What are the context-mechanism-outcome configurations within percussion-related interventions as found through the systematic review process?

Articulation of prior intervention theories. Authors have discussed categories of musical function, both in general (Brunk, 2004; Merriam, 1964; Sears, 1968) and more specific to percussion (Gaston, 1968; Matney, 2004; 2007; in press; Reuer et al., 1995). Where percussion-related functions have articulated some useful theories related to clinical practice and trends in literature, they have not been rigorously examined in relation to intervention effectiveness and client impact.

Identification of Studies

Keyword creation and use. The investigator used the keywords (Table 2) originally proposed by Matney (2004), and updated in Matney (in press) in order to perform flash drive, electronic database, and hard-copy journal searches. Electronic database searches used the same keyword list as the flash drive and hardcopy searches, but also employed the Boolean operator "and," along with the words "music" and "therapy." Further detail on the implementation of keywords can be located in Matney (in press).

Table 2

Database Search Keywords

afuche(s)	darbouka(s)	kit(s)	tamborim(s)
agogo(s)	djembe(s)	kokiriko(s)	tantan(s)
ashiko(s)	djun(s)	koudounia	tambour(s)
bata	djundjun(s)	marimba(s)	tambourine(s)
bell(s)	djun-djun(s)	maraca(s)	temple+block(s)
binzasara(s)	doumbek(s)	mbira(s)	tibetan bowl(s)
block(s)	drum(s)	metallophone(s)	timba(s)
bongo(s)	drumming	ngoma(s)	timpani
boomwhacker(s)	dumbek(s)	ocean	tom(s)
cabasa(s)	dundun(s)	Orff	tombak(s)
caixa	dunun(s)	pandeiro(s)	tonbak(s)
cajon(s)	egg(s)	percussion	tone block(s)
castanet(s)	gamelan	rainstick(s)	tone chime(s)
caxixi	gangoqui(s)	rattle(s)	thumb piano(s)
chime(s)	gankoqui(s)	rhythm instruments	trap
chocallo(s)	ganza	rhythm sticks	triangle(s)
clatterpillar(s)	glockenspiel(s)	sandblock(s)	tubano(s)
clave(s)	gong(s)	sand+block(s)	vibraphone(s)
conga(s)	guiro(s)	shaker(s)	vibraslap(s)
"congo(s)"	handbell(s)	"shakeray(s)"	vibratone(s)
cowbell(s)	handchime(s)	shekere(s)	wood+block(s)
cymbal(s)	hand + chime(s)	singing bowl(s)	xylophone(s)
daiko	jembe(s)	snare(s)	wadaiko
daf(s)	jingle(s)	surdo(s)	yambu(s)
darbuka(s)	kalimba(s)	tabla(s)	
darabuka(s)	kettledrum(s)	taiko	

Information Sources. The investigator used many resources to retrieve information, beginning with the *American Music Therapy Association* (AMTA) *Music Therapy Research, Third Edition* flash drive (2009). This flash drive contained the following journals: (a) *Journal of Music Therapy* (1964-2008), (b) *Music Therapy* (1981-1996), and (c) *Music*

Therapy Perspectives (1982-1994). Online searches of the following journals were also conducted: (a) *Nordic Journal of Music Therapy* (1997-2012), (b) *Canadian Journal of Music Therapy* (2004-2012), (c) *Australian Journal of Music Therapy* (1996-2005), (d) *Arts in Psychotherapy* (1980-2012), and (e) *Music and Medicine* (2009-2012). The investigator also searched the following databases: *American Psychological Association* (*PsychInfo*), *Cumulative Nursing* (*CINAHL*), *EBSCOHost*, *ECO*, *First Search*, *ProQuest Nursing and Allied Health Source*, PubMed, *WorldCat*, *Academic Search Complete*, *Dissertation Abstracts Online,* and *ProQuest Dissertations and Theses*. Finally, the investigator conducted hand searches of publications unavailable in electronic form. Hand searches included the *Journal of Music Therapy* (2009-2014), *Music Therapy Perspectives* (2009-2014), and the *British Journal of Music Therapy* (1968-2014). Data were collected through the library resources available at Texas Woman's University, the University of Kansas, the investigator's personal hardcopy and flash drive library, and resource assistance from colleagues. The author delimited the study to include articles from 1941 to 2014.

Database Creation. The investigator used a database created for Matney (in press). The database was created using Pages software by Apple computers. In the prior study, the investigator included the following columns: (a) year, (b) author, (c) source type (to differentiate journal articles from other publications), (d) population category (e.g., medical), (e) percussion instruments used (e.g. conga), (f) type of article/method/study (e.g., randomized controlled trial), (g) sample size (when applicable), (h) therapeutic function category (e.g., cognitive), (i) therapeutic function subcategory (e.g., impulse control), (j) therapeutic application category (e.g., accompaniment), and (k) therapeutic application subcategory (e.g., therapist accompanying client improvisation). These columns were used to help configure specific contexts within which percussion was used in therapy. The

investigator added new columns for this study, including: (l) intervention setting, (m) intervention and control conditions in relation to experimental studies, (n) intervention description in relation to qualitative studies, (o) demonstration of significant change regarding outcomes in experimental studies, (p) demonstration of reflective meaning regarding outcomes in qualitative studies, (q) context, (r) mechanism, and (s) outcome (Pawson et al., 2004).

Identification. The investigator began with the article database employed by Matney (in press), which located 586 articles for a content analysis. The author of the prior study conducted a screening of these 586 articles, as based on the following inclusion criteria:

- investigated a health care intervention that used percussion instruments
- written in the English language

Matney (in press) also excluded articles during his screening for the following reasons.

- elimination of duplicates (n=3). Duplicates were defined as publication of the same study multiple times. In each case, the article published second was eliminated.
- elimination of untested protocols (n=3). Untested protocols included studies that proposed the testing of an intervention, but the actual testing of that intervention had not yet occurred.

The above inclusion and exclusion criteria (Matney, in press) resulted in 580 articles to be screened for the current study.

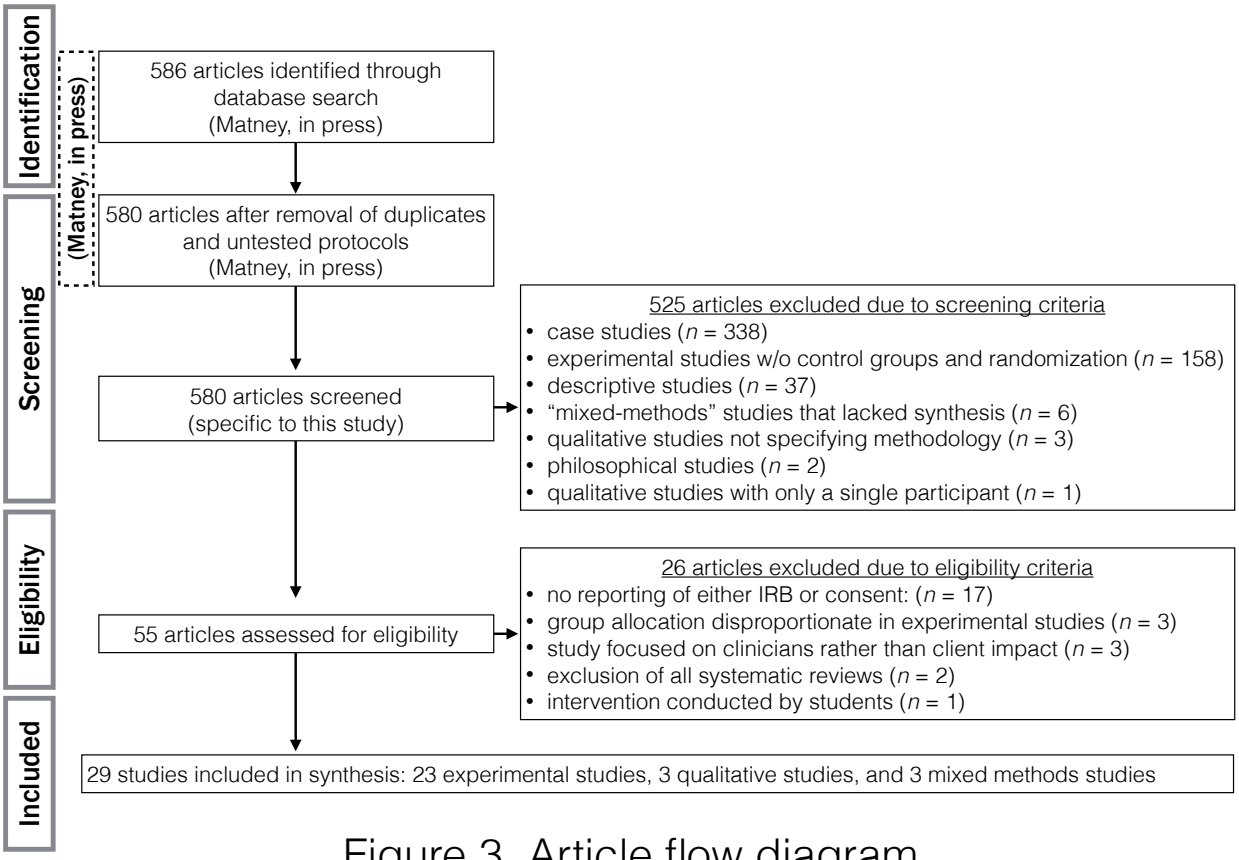

Figure 3. Article flow diagram

Appraisal of Evidence: Screening and Eligibility of Included Studies

Screening. The investigator evaluated the article database originally created by Matney (2007), for screening (See Figure 3). Due to the broad range of article types used in the prior study, particular article types would not provide the content or quality needed to answer the research questions. Three examples follow: An article that merely describes a clinical intervention as an idea would not be able to communicate effectiveness. A case study would not include enough participants to describe any level of generalized effectiveness or impact. An experimental study that does not include randomization and a control group runs the risk of increased bias, which may compromise clinical effectiveness. Therefore, the investigator established the following exclusion criteria for screening:

- Does not implement interventions (e.g., philosophical research, historical research, surveys)
- Not research based (i.e., in the broadest sense, demonstrating a systematic approach to inquiry)
- Purely or primarily anecdotal accounts of clinical practice (e.g., case examples, vignettes)
- Experimental studies that do not include randomization and a control group
- Mixed-methods studies that do not include a synthesis of methodologies as a part of results or discussion
- Qualitative studies that do not explicitly articulate methodology
- Studies only including single participants (e.g., case studies)

The above exclusion criteria for screening resulted in the elimination of 525 articles. The investigator chose exclusion criteria due to the need to address each research question. Each article was therefore required to promote a level of effectiveness (or ineffectiveness) of an intervention beyond the single client, and to promote a particular level of rigor as related to the chosen methodology. Experimental studies (employing a positivist or post-positivist epistemological position) were expected to promote the elimination of bias through randomization. Qualitative studies (employing more constructive epistemological positions) were expected to demonstrate a particular level of collective response, as well as a transparent methodology. The terms randomization and qualitative studies require further explanation in order to clarify and justify exclusion criteria.

Randomization. Researchers and research consumers generally understand randomization as the process by which each subject has the same chance of being assigned to

the respective intervention groups or a control group (when such has been used). Studies within this particular evaluation have reported the use of randomization, and have articulated the generation of random numbering for assignments (e.g., flipping a coin, use of a random number generator) (Suresh, 2011). Any article that did not describe the use of randomization was excluded from the study.

Qualitative Methodologies. The term qualitative has generally described a broad range of study types that are not experimental in nature, but rather focus on narrating individual or collective experiences. Creswell (2007) categorized five primary types of qualitative inquiry: (a) narrative research, (b) phenomenology, (c) grounded theory, (d) ethnography, and (e) case study. For the purposes of this evaluation, a qualitative study was excluded if: (a) it was a single-participant case study (b) it did not articulate a specific methodology, or (c) its articulation of method or methodology did not agree with Creswell's categories. For example, if a study described itself as a "focus group" qualitative study, it discussed the use of a method without a methodology, and was therefore excluded. The investigator for the present evaluation took into account that each of Creswell's categories can include subcategorical methodologies (e.g., hermeneutic phenomenology), as articulated both by Creswell (2007) and Crotty (1998).

Mixed-methods Studies. The term mixed-methods is now understood as a methodology that not only employs multiple methods, but also connects or merges results of those methods to form a cohesive whole (Bradt et al., 2013; Pearson et al., 2014). A report was only considered mixed-methods if researchers followed procedures according to this definition.

Evaluation Tools Used to Determine Quality of Research Studies. Evaluation tools helped facilitate the screening, eligibility, and quality determinations of the identified studies. The evaluation tools can be located in Appendix A, Appendix B, and Appendix C.

Descriptions of each tool follow. Furthermore, details for above exclusion parameters are reflected in relation to each evaluation tool:

- The Checklist to Evaluate a Report of Non-Pharmacological Trial (CLEAR NPT) (Boutron et al., 2005) assesses randomization, group allocation, reporting of intervention details, qualifications of intervention implementer, participant adherence, blinding, potential treatment covariates, follow up scheduling, and use of intention to treat. If an allocation sequence was not randomized, or was weighted beyond the exclusion criteria levels, then the article was excluded.
- The COREQ (Tong et al., 2007) evaluation tool for qualitative methodologies assesses characteristics and qualities of the researcher, the researcher's credentials and experience, the researcher's relationship with participants, the characteristics about the intervention facilitator, the methodology used, participant recruitment and selection, refusal to participate and dropout rates, location of data collection, other people present during intervention, sample characteristics, author's relationship to investigation implementation (e.g., interviewing), types of data, methods of collection, participant feedback, reporting and methods of coding, transparent reporting of specific material to support coding, and synthesis of material. If the article did not articulate a particular qualitative methodology, it was excluded from the study.
- The Mixed-methods Appraisal Tool (Pluye et al., 2009) assesses mixed methodologies for: identifying review questions/objectives/activities, type of review perspective (exploratory, confirmatory, or both), reporting of procedure, reporting of key findings, reporting of quantitative items, reporting of

qualitative items, and type of synthesis that justifies the use of a mixed-methods study. If an article did not synthesize methodologies, it was not considered a mixed-methods study and was therefore excluded.

Eligibility. In theory, a *pure* realist synthesis contrasts other systematic reviews in that the process tends not to exclude articles based on eligibility criteria (Rycroft-Malone et al., 2012). Realist synthesis understands any intervention as a theory. Researchers therefore seek to locate intervention fidelity, but also acknowledge that studies may contribute by describing what mechanisms *do not work* in particular settings. However, some realist synthesis studies and protocols discuss exclusion criteria in relation to study types and study quality (Brown et al., 2015; Kane et al., 2010). According to Rycroft-Malone et al (2012), Pawson has suggested that inclusion occurs when the theory is "good and relevant enough" (p. 6). For the present study, the investigator evaluated articles (n = 55) for goodness of fit. The investigator conducted an iterative appraisal process using evaluative tools. The appraisal process illuminated studies that lacked rigorous methods. Factors for goodness of fit resulted in additional exclusion criteria for eligibility:

- Any study where someone implemented the intervention not qualified to perform a professionally oriented intervention (e.g., university student). A professional, such as a therapist or teacher, was considered qualified to implement the intervention.
- No clear report of internal review board compliance or of participant consent. Reporting of one of these two provided some assurance of ethical fulfillment. Consent reporting was defined as the use of the term consent

- Experimental studies where the group with the most participants was more than 50% larger than the group with the least participants. While some variance in experimental and control groups is likely to occur, studies that employed severely weighted groups risked compromising their data and their statistical analysis due to possible introductions of bias.
- Qualitative studies that focus on therapist perspectives rather than client impact. While these studies are valuable in their own right, the focus on this study was to better understand how interventions impact clients. Therefore, client perspectives maintain primary importance.
- Studies described as mixed-methods or "using quantitative and qualitative methodologies," but results and discussion not discussing a synthesis of multiple methodologies.
- Studies that do not provide enough information about context, mechanism, or outcome.

Questions about goodness of fit, relevance and exclusion during the eligibility phase were guided by the identified research questions and the clarified purposes of this study. The investigator documented a clear rationale for each document that was excluded, as related to the above criteria. A total of 26 documents were excluded, resulting in 29 articles that were analyzed for synthesis.

In order to measure reliability of evaluation tool results for the 29 identified studies, a research assistant evaluated 20.69% of studies ($n = 6$). The investigator randomly selected the first study for reliability check by pointing to within the middle range of the alphabetized study set. The investigator selected the subsequent five studies by skipping through the

alphabetized list, locating every fifth study in the list until six total studies were located. The investigator and assistant discussed the checklists prior to evaluation. The research assistant appraised five experimental articles with the CLEAR NPT checklist, and appraised one qualitative study with the COREQ evaluation report. No mixed-methods studies were selected through the randomized process. Therefore the research assistant did not appraise any mixed-methods studies.

Data Extraction to Determine Context-Mechanism-Outcome Configurations

The investigator extracted data on multiple components (See an example in Table 3), beginning with data from Matney (in press), and following up with further information from each individual study.

- Context information was first extracted from the database used in Matney (in press). The context information included the population studied and the setting. The investigator then re-read each individual article included in the present study to find more details about participant demographics, as well as more details regarding the setting where the study was implemented.
- Mechanism information from the database included the described therapeutic application, instrumentation used in the study. The investigator then read each article to include any theories linked to the intervention (whether as a prior framework or a post-hoc discussion), as well as the specific intervention method detailed by the individual study.
- Outcome information included descriptions of outcomes that were significant and not significant in experimental studies. Significance in each study was measured with an alpha level at lower than five percent ($p < .05$). Outcome information also

included themes of client impact as discussed in qualitative and mixed-methods studies. In those instances where unintended outcomes and potential contraindications were mentioned, the investigator included such in the coding process.

Configuration occurs when a researcher arranges findings from identified articles (Gough & Thomas, 2012). The investigator arranged the above individual components (context, mechanism, outcome) in order to locate and integrate patterns regarding intervention types, the contexts they were used in, and the intervention details that connected the contexts and outcomes (see Table 6). Aggregation occurs when a researcher attempts to create a whole out of the individual components in identified articles (Gough & Thomas, 2012). The investigator conducted aggregative processes to locate and synthesize themes in contexts, mechanisms, and outcomes. The investigator also synthesized these components to offer context-mechanism-outcome propositions (CMOC's).

Table 3
Data Spreadsheet Components with Examples

Component		**Example**
Author		John Doe
Year		2014
Type of Article/Method/Study		randomized controlled trial
Sample Size		*n* = 12
Therapeutic Function		social cohesion
Context		
	Population	multiple sclerosis
	Setting	medical
Mechanism		
	Theory (framework or post hoc)	active music engagement
	Intervention setting	group setting in clinical environment
	Instruments Used	conga
	Therapeutic Application	clinical improvisation: grounding
	Method	(steps described by study)
Outcome		
	Experimental	significant or not significant
	Qualitative	impact

Data Synthesis

Data synthesis exists as the culminating event in a systematic review. Hanson-Abromeit and Sena Moore (2014) described synthesis as "the integration of characteristics from separate studies into collective unified statements that respond to the specified research question(s)" (p. 28). Pawson and other authors who helped to develop realist synthesis provided limited guidance as to how data would be synthesized. These authors suggested that researchers (a) compare and contrast findings from different studies, (b) use findings from studies to address purposes of review, (c) seek both confirmatory and contradictory findings, and (d) refine programme theories in light of new evidence (Pawson et al., 2004). However, these suggestions fail to make the synthesis process transparent. Rycroft-Malone et al. (2012) provide a more transparent and practical procedure that aligns maintains the integrity of Pawson's intention for realist synthesis:

1. Organize extracted data (context, mechanism, outcome) from spreadsheet into evidence tables. The investigator organized evidence for each individual study (see Table 6). The investigator also located themes and frequencies related to context, mechanism, or outcome. Context themes included details about the setting and participants. Mechanism frequencies included information about (a) study theories, (b) frequency and duration of intervention, (c) instruments used, (d) the proportion of the intervention with which percussion was used, (e) the therapy methods used as related to percussion, (f) the music methods mentioned outside of percussion use, and (g) the procedures that were added to music experiences. The investigator also reported outcome themes in relation to domains.
2. Formulate and link chains of inference from the evidence tables: Rycroft-Malone et al. (2012) defined a chain of inference as a "connection that can be made across articles

based on the themes identified" (p. 7). The investigator linked common and successful outcomes to particular populations.

3. Review articles related to chains of inference to ensure linkage. This step promotes an increase in research validity. The investigator reviewed articles to double check contexts, mechanisms, and outcomes, as well as to make sure the three components were linked in the study.
4. Formulate hypotheses as informed by chains of inference. This step synthesizes information across articles, resulting in a description of context, mechanism, outcome configurations. The investigator linked similar outcomes with any shared contexts or mechanisms (see Figure 4).

Developing Narrative

Pawson et al. (2004) noted that the purpose of a realist synthesis is to describe the relationships between interventions and the contexts in which those interventions occur. This speaks to realist synthesis as a type of theory-driven inquiry, promoting an evidence base that seeks to connect theory, research, and practice. The diversity of methodologies used within the literature was synthesized using narrative, tables, and figures.

CHAPTER IV

Results

An underlying assumption found in the evaluation of the 29 studies (see Table 6) is that percussion plays a role in music interventions that support clients with a variety of needs. This role may manifest as a primary role, where a large proportion of the session includes percussion use, or a secondary role, where percussion use makes up a smaller portion of the overall intervention. Regardless, the interest in percussion use is to function effectively as a tool to promote health and development. This section will discuss results related to the two research questions.

Research Question 1: When Using Published Tools Designed to Evaluate Quality of Research, What Was the Outcome of this Appraisal Process When Reviewing Identified Studies?

The investigator for this study insisted that either IRB compliance or report of participant consent was a mandatory ethical consideration. Of the 55 studies evaluated for study eligibility, 30.91% (n = 17) did not report procedures related to informed consent or IRB compliance, and were therefore excluded. Other reasons for exclusion included: (a) disproportionate group allocation (n = 3), (b) study focus on clinicians rather than client impact (n = 3), (c) systematic reviews too broad for inclusion (n = 2), and the intervention conducted by university students (n = 1). This resulted in 29 total studies included in the final analysis (see Figure 3).

The investigator evaluated experimental, qualitative, and mixed-methods studies using published appraisal tools. These tools assisted in locating data related to exclusion criteria. The investigator evaluated experimental studies using the Checklist to Evaluate a Report of Non-Pharmacological Trial (CLEAR NPT) (Boutron et al., 2005). Qualitative studies were

evaluated using the Consolidated Criteria for Reporting Qualitative Research (COREQ) (Tong et al., 2007). Mixed-methods studies were evaluated using the Mixed-methods Appraisal Tool (Pluye et al., 2009). Evaluation of experimental, qualitative, and mixed-methods studies are discussed below.

Evaluation of Experimental Studies. The investigator evaluated the 23 experimental studies using the Checklist to Evaluate a Report of Non-Pharmacological Trial (CLEAR NPT) checklist (Boutron et al., 2005) (see Appendix A). Table 4 reports each answer to this checklist by percentage. Adequacy of allocation included group distributions that detailed the type of randomization used. If an article mentioned random allocation, but did not describe the type of randomization, then the investigator reported allocation as "unclear." Regarding allocation concealment, the investigator answered "yes" or "no" if the study specifically reported one way or the other. The investigator answered "unclear" if there was no clear report. Regarding details of intervention reporting, the investigator answered "unclear" to any report that did not detail specifics of the instrumentation used (e.g., "percussion instruments" or "rhythm instruments" within the intervention. The investigator answered "no" when a study did not provide any details about the intervention process. The investigator answered "no, not feasible" to client and caregiver blinding procedures due to the transparent nature of music therapy interventions. Regarding assessor blinding, the investigator provided answers in relation to the specific reporting provided; "unclear" was answered when the study did not report assessor blinding.

Table 4
Results of Experimental Study Appraisal Using the CLEAR NPT Checklist
Total Studies = 23

	Yes	No	Unclear
Allocation sequences adequate?	65.21%	0.00%	34.79%
Treatment allocation concealed?	39.13%	17.39%	43.48%
Details of intervention made available?	52.17%	4.35%	43.48%
Experience or skill level appropriate?	100.00%	0.00%	0.00%
Participant adherence assessed quantitatively?	34.78%	65.22%	0.00%

	Yes	No, not Feasible	No	Unclear
Participant blinding	0.00%	100.00%	0.00%	0.00%

	Yes	No	Unclear
If no on above, were treatments same in each group?	43.47%	30.43%	21.74%
If no on above, were withdrawals/losses same?	39.13%	43.47%	13.04%

	Yes	No, not Feasible	No	Unclear
Caregiver blinding	0.00%	100.00%	0.00%	0.00%

	Yes	No	Unclear
If no on above, were treatments same in each group?	43.47%	30.43%	21.74%
If no on above, were withdrawals/losses same?	39.13%	43.47%	13.04%

	Yes	No, not Feasible	No	Unclear
Assessor blinding	26.09%	0.00%	30.43%	43.48%

	Yes	No	Unclear
If no, on above, were specific methods used to avoid ascertainment bias? (N = 7)	14.29%	0.00%	85.71%

	Yes	No	Unclear
Follow up schedule same in each group?	30.43%	69.57%	13.04%
Main outcome analyzed according to *intention to treat*?	30.43%	30.43%	39.13%

Evaluation of qualitative studies. Of the 29 studies identified and evaluated, three studies employed qualitative methodologies. The investigator evaluated each of these studies using the Consolidated Criteria for Reporting Qualitative Research (COREQ) evaluation report (Tong et al., 2007). The COREQ (see Appendix B) is separated into three domain areas: (a) research team and reflexivity, (b) study design, and (c) analysis and findings. Results of the COREQ evaluation can be found in Table 5.

Table 5

Findings from appraisal of qualitative studies using the COREQ evaluation tool

Domain 1: Research team and reflexivity
One of three studies did not clearly articulate who conducted the interviews
One study was conducted by a music therapist, one study by nurses, and one study by a hospital musician and other researchers.
One study was conducted by three women, one by one woman and one man, and one by one woman.
Experience and training with population was not described in two studies. The third study described the author's prior work with the population.
In two of the studies, investigators had established a prior relationship with participants by providing music-based services or music therapy. The third study did not report on a prior relationship.
Each study reported characteristics about the authors
Domain 2: Study design
Study methodologies included a content analysis and two grounded theory studies.
Each study used purposive sampling through facility referrals.
Two studies did not discuss how participants were approached. The third study described the use of interaction, including with live music, before requesting consent.
Each study had a different amount of participants: (a) 308, (b) 17, and (c) 6.
No study mentioned any withdrawals in their report.
Data was collected at the facility during each study.
Two studies did not report anyone else present during sessions. One study discussed inclusion of staff.
Populations included children in a pediatric setting, people diagnosed with multiple sclerosis, and people living in a nursing home. More specific characteristics are provided in Table 6.
None of the investigators conducted a pilot test of their respective studies.
None of the studies conducted repeat interviews with participants.
All three studies used audio recording to collect data. One study also used video recording.
Two of the studies used field notes. One study did not mention field notes.
Regarding interview duration, one study mentioned until material was saturated. Another study mentioned the asking of six to twelve questions. The other study did not state the duration of interviews.
One study mentioned data saturation. The other two studies did not.
No study requested participant feedback on transcriptions.
Two of the three studies provided a description of the coding tree for themes.

Table 5 (continued)

Domain 3: Analysis and findings
One study employed two data coders. Another study employed one data coder. The other study did not report the amount of data coders.
All three studies derived themes directly from data (as opposed to pre-established themes).
One study used Atlas T1 software to manage data. The other two studies did not report use of software.
None of the studies employed participant feedback on findings.
All three studies used participant quotations to illustrate themes.
Two of the studies identified quotations in relation to participants (using surnames). One study did not identify quotations.
All three studies demonstrated consistency between findings and themes.
All three studies clearly presented major themes.
All three studies described discussion of minor themes.

Evaluation of mixed-methods studies. Three of the identified studies employed mixed-methods (Bensimon, Amir, & Wolf, 2012; Grocke, Bloch, & Castle, 2009; Wormit, Warth, Koenig, Hillecke, & Bardenheuer, 2012). The investigator evaluated these studies using the Mixed-methods Appraisal Tool (Pluye et al., 2009), which evaluated the method and reporting processes of a study (see Appendix C). Results of the evaluation of these three studies were as follows:

- Each of the three studies provided a description of review aim and purpose. However, none provided specific review questions or review objectives.
- Two of the studies took an exploratory review stance. One study sought to confirm a hypothesis.
- Two of the studies described the details of their narrative procedure. One study did not report the procedure, but it was deduced from the findings.
- Each of the studies reported key findings and summaries through their narrative process, but each through different types of methodologies: content analysis with music notation analysis, thematic analysis, and case study.

- One study analyzed results using descriptive statistics. The other two studies employed t tests.
- Regarding integration of methodologies, one study employed an assimilation stance. Two studies discussed the complementary stances of the two methodologies.

Inter-Rater Reliability of Studies Using Appraisal Tools

The author assessed evaluation tool results through an inter-rater reliability check. Each question was given a one-point value. Researcher evaluations were measured against the research assistant evaluations for six of the 29 identified studies. The research assistant appraised five experimental articles with the CLEAR NPT checklist, and appraised one qualitative study with the COREQ evaluation report. Calculations resulted in an inter-rater reliability percentage of 91.67%.

Research Question 2: What are the Context-Mechanism-Outcome Configurations Within Percussion-Related Interventions as Found Through the Systematic Review Process?

The investigator coded contexts, mechanisms, and outcomes for each study according to their respective operational definitions, in order to create evidence tables (see Table 6). Contexts included details about the participants and the setting. Mechanisms included information about theory, frequency and duration of intervention, music instrumentation used, and reported details about the intervention. Outcomes were understood as an intended change in health. Significant outcomes, as noted in Table 6, were noted by each of the identified experimental studies as an alpha level of less than five percent ($p < .05$). Impact was noted when a qualitative or mixed-methods study described themes of impact as offered by participants. The investigator then linked chains of inference from the evidence tables to assist in locating connections among contexts, mechanisms and outcomes (see Figure 4).

Frequency of Populations. The investigator included twenty-nine studies in the final evaluation (see Figure 3), the investigator located the following general populations:

- Seven studies working with mental health-related populations (Albornoz, 2011; Bensimon et al., 2012; Bittman, Dickson, & Coddington, 2009; Currie, 2012; Goldbeck & Ellerkamp, 2012; Grocke et al., 2009; Lu et al., 2013)
- Six studies examining interventions with medical populations (Ghetti, 2011; Magee & Davidson, 2004; Mandel, Hanswer, Secic, & Davis, 2011; Preti & Welch, 2011; Walworth, Rumana, Nguyen, & Jarred, 2008; Wormit et al., 2012)
- Four studies working with participants diagnosed with dementia (Chu et al., 2013; Raglio et al., 2008; Särkämo et al., 2013; Sung, Lee, Li, & Watson, 2012)
- Four studies working with non-clinical populations, including university students (Gadberry, 2011; Lim, 2008), health care employees (Bittman, Bruhn, Stevens, Westengard, & Umbach, 2003), and corporate employees (Wachi et al., 2007)
- Two studies working with older adults (Chen, Lin, & Jane , 2009; Mohammadi, Shahabi, & Panah, 2011)
- Two studies working with participants on the autism spectrum (Gattino & Riesco, 2011; Lagasse, 2014)
- Two studies working with clients diagnosed with intellectual disabilities (MacDonald & O'Donnell, 1994; MacDonald, O'Donnell, & Davies, 1999)
- One study working with participants who have migraine headaches (Koenig et al., 2013)
- One study working with clients in palliative care (Gutgsell et al., 2013)

Table 6

Summary of Studies: Description, Context, Mechanism, Outcome

			Context		Mechanism				Outcome		
Author	Description	n	Participants	Setting	Theory	Frequency/ Duration	Instruments	Method	Significant	Not Significant	Impact
Albornoz et al. (2011)	Randomized controlled trial measuring the effect of group improvistional music therapy on depression in adolescents and adults with substance abuse	24	Spanish-speaking, diagnosed with an addiction problem and significant depression	Substance abuse rehabilitation facility in Venezuela	Framework (implied): Artistic Music Therapy	12 sessions over three months. Each session two hours long	"Simple percussion instruments"	• Group sessions • referential and non-referential improvisations • free discussion • use of other artistic media to further explore themes • performances	Reduction in psychologist report of depression	Reduction in self-report of depression	-
Bensimon et al. (2012)	Mixed methods study examining the use of Group Music Therapy (GMT) with soldiers diagnosed with PTSD	9	Men, 20-23, with combat-induced PTSD	Military Unit for Combat Stress Reactions,	Framework (implied): Group Music Therapy, Post hoc: Pendulation Theory	16 weekly sessions x 90 minutes each	Percussion (wood and metal), darbuka, tabla, floor drum, djembe	• Group sessions • Improvisation with group choices and discussion about associations and verbal processing • High volume drumming •Listening to relaxing music	-	-	• Expression of rage • mixed reactions to receptive relaxation • Association with trauma to be processed

Table 6 (continued)

			Context		Mechanism				Outcome		
Author	Description	n	Participants	Setting	Theory	Frequency/ Duration	Instruments	Method	Significant	Not Significant	Impact
Bittman et al. (2003)	Experimental study measuring the effect of recreational music making on reduced burnout and improved mood states		Health care employees ranging in age from 19-78 (Mean age of 43.8)	Westbury United Methodist Retirement Community, Meadville, PA.	-	Six sessions, each one hour in length	Auxiliary percussion, hand drums, sound shapes, bells, maracas, fruit shakers	• Introduction • Guided imagery to background music • Shaker pass with increased tempo over time • Basic drumming instruction • Group play promoting entrainment •Playing drums with a familiar song • Non verbal expression on drums, related to emotion-oriented questions, followed by group discussion and recapitulation of themes • Guided imagery exercise and discussion about experience	• Reduction in emotional exhaustion • Increased Personal accomplishment • Reduced tension/anxiety • Reduced depression/ dejection • Reduced anger/ hostility • Increased vigor/activity • Reduced fatigue	• Depersonal-ization • Confusion/ Bewilderment	-

Table 6 (continued)

			Context		Mechanism				Outcome		
Author	Description	n	Participants	Setting	Theory	Frequency/ Duration	Instruments	Method	Significant	Not Significant	Impact
Bittman et al. (2009)	Experimental study measuring the effect of musical expression on quality of life improvement on adolescents placed in a court-referred residential treatment program	52	• 30 females and 22 males • Reports of past sexual abuse, past abuse/neglect, and history of school truancy. • Mean age of 14.5	Court-referred treatment facility for children and adolescents in Bethesda, MD.	-	10 weekly sessions, 1.5 hours each	Shakers, hand drums, auxiliary percussion, bells, maracas	•Introduction •Unstructured improvisation ("jam session") • Music assisted relaxation • Shaker pass with tempo increase • Playing name and tapping out syllables on drum • Entrainment through rhythmic exercises, with no musical expectation • Non-verbal (through drums) and verbal expression regarding challenges and values • Tactile and visual props associated to feelings • Repetition of music assisted relaxation	• Improved school/work role performance • Reduced total depression • Reduced negative affect • Reduced negative-self evaluation • Reduced instrumental anger • At 6 week follow up, improved school/work role performance, and improved behavior towards others	• Home role performance • Community role performance •Behavior towards others (short term) • Mood • Self harm • Thinking • Dysphoric mood • Somatic complaints • Total anger • Reactive anger • Anger control • Self concept • Introversion • Alienation • Anger • Aggression •Interpersonal problems • Lability •Disorient-ation • Suicide • Social adaptation	-

Table 6 (continued)

			Context		Mechanism				Outcome		
Author	Description	n	Participants	Setting	Theory	Frequency/ Duration	Instruments	Method	Significant	Not Significant	Impact
Chen et al. (2009)	Thematic and content analysis exploring experience of group music therapy for older adults living in a care facility	17	11 females and 6 males, range of 70-90 years old (mean age = 80.5 years)	350 bed care facility in Changhua City, central Taiwan	-	One hour per week for three months, then one hour per two weeks for a year	Bells, castanets, drums, cymbals, wood blocks	• Greetings • Physical touch (hand massage by participants or caretakers) • Movement of upper bodies to music while also playing bells or castanets • Group percussion play • Non-musical group play • Receptive experience while a guest played music • Closure	-	-	•Sense of energy • Distraction from suffering • Validation as a person • Variety to lifestyle • Motivation to exercise • Positive behavior • Life satisfaction

Table 6 (continued)

			Context		Mechanism				Outcome		
Author	Description	n	Participants	Setting	Theory	Frequency/ Duration	Instruments	Method	Significant	Not Significant	Impact
Chu et al. (2014)	Randomized controlled trial measuring the effect of group music therapy on depression and cognition in people diagnosed with dementia	100	• Diagnosis of dementia with an age range of 65-97 (mean age = 82) • 53 females and 47 males • 62 with moderate dementia, 17 with mild dementia, and 21 with severe dementia	Recreation rooms within three separate nursing homes in Taiwan	Framework: (implied): Reduction of stress levels to promote psychologi-cal and physical well-being	Two 30 minute sessions per week for six weeks	Triangles, clappers, maracas, handbells, "color sound bells" (push bells)	• Session 1-2 instrumental play • Session 3-4 therapeutic singing • Session 5-6 music listening • Session 7-8 use of color bells to promote attention and hand function • Session 9-10 cultural music • Session 11-12 group improvisations initiated by individuals	Improved short term memory recall, including during one month follow up. Most effective for those with mild or moderate dementia	Cortisol level as related to stress reduction and depression	-

Table 6 (continued)

			Context		Mechanism				Outcome		
Author	Description	n	Participants	Setting	Theory	Frequency/ Duration	Instruments	Method	Significant	Not Significant	Impact
Currie (2012) (Study 2)	Experimental study measuring effect of percussion-based interventions on reducing adolescent reactive aggression	65	Boys ranging in age from 12-15 years old (mean age = 13.8 years old with at least two aggressive in-school behaviors. 34 had intact families, 18 with single parent families, 7 had a step-parent, and 6 lived in foster care	Five schools in the Hunter region of Australia, in areas of low socio-economic status	Framework (explicit): Doing Anger Differently	Two sessions per week for ten weeks. Focus areas last for two to three session.	Congas, djembes, hand drums, bass drum, snare drum, cowbells, shakers, auxiliary percussion	Focus Areas that last for two or three sessions: Each one using percussion exercises and discussion • Icebreaker that promotes group cohesion and opens discussion about power dynamics • Mapping an episode of anger from lives of each participant • Simulation of power imbalance • Situated choice for facilitating impulse control • Role playing to promote thinking about consequences of actions • Problem solving	• Lowered aggression reports • Lowered trait anger • Lower anger-out	• Depression • Self esteem	-

Table 6 (continued)

			Context		Mechanism				Outcome		
Author	Description	n	Participants	Setting	Theory	Frequency/ Duration	Instruments	Method	Significant	Not Significant	Impact
Gadberry (2011)	Experimental study measuring the effect of steady beat on state anxiety	38	University students ranging in age from 20-50 years old (mean age = 34 years old).	University in the midwest of the United States. Research room	-	One time for two minutes	Sub Contra C Bass Bar	Participants worked with individually. Bass bar played by therapist at a steady beat of 66 beats per minute	Reduction in perceived anxiety	-	-
Gattino et al. (2011)	Randomized controlled study measuring the effects of relational music therapy on communication of children with autism	24	Boys diagnosed with autism (10), Asberger's (2), or PDD-NOS (12). Age range of 7-12 years old (Mean age = 9.75 years old)	Hospital in Porto Alegre, Brazil	Relational Music Therapy	Three assessment sessions (30 minutes), 16 weekly sessions (30 minutes), final assessment session (30 minutes) over 7 months.	Rattles, rainstick, tamborim, tambourine, cowbell, drum, drum sticks, guiro, cabasas, claves	Interactions that take place in the moment through singing, composing, improvising, and musical games. Often client led, with use of some psychodynamic principles. Instruments placed on floor or table for participant choice. Parents may also be included in sessions	Improvement in Non-verbal communication for autism subgroup.	• Nonverbal general) • Verbal • Social commu-nication	-

Table 6 (continued)

			Context		Mechanism				Outcome		
Author	Description	n	Participants	Setting	Theory	Frequency/ Duration	Instruments	Method	Significant	Not Significant	Impact
Ghetti (2011)	Randomized controlled trial measuring the effect of Active Music Engagement with Emotiona-Approach Coping to improve well-being in liver and kidney transplants	29	Inpatients, 15 liver transplants, 14 kidney transplants . Age range 32-53 (M = 50.1 years). 17 male and 12 female.	Organ transplant unit in a teaching hospital	Framework (explicit): Active Music Engage-ment combined with Emotional-Approach Coping	Single session of 30-40 minutes	"Rhythm instruments"	• Assessment of music preferences • Client interest in caregiver participation honored • Introduction to instruments • Encouraging instrumental accompaniment of 2-3 songs, choice of upbeat or calming music • Use of verbal processing triggered by musical or lyrical content, potentially related to coping skills. closing song focusing on a coping strategy.	• Decrease in pain • Decrease in negative affect	• Ambulation • Coping • Hospital satisfaction	-

Table 6 (continued)

			Context		Mechanism				Outcome		
Author	Description	n	Participants	Setting	Theory	Frequency/ Duration	Instruments	Method	Significant	Not Significant	Impact
Goldbeck et al. (2012)	A randomized controlled trial measuring the effect of Multimodal Music Therapy on remission of anxiety in children with anxiety disorders	36	Ages 8-12 years old, diagnosed with anxiety disorder (separation anxiety, generalized anxiety, social phobia, specific phobia), 18 male, 18 female, caucasian	Study centre in Ulm, Germany	Framework (Implied): Multimodal Music Therapy	Three sessions of individual MT (60 minutes), 9 group sessions (100 minutes). Also, parent training session (2x50 minutes)	Percussion, drums, log drums	• Individual and group sessions • Choosing instruments to play • Structured/ thematic improvisations, including improvisation of anger/ aggression • Combined with Cognitive Behavioral Therapy, other creative arts (e.g., drawing, puppetry)	•Reduced anxiety remission rates, including up to four months via follow up •Reduced self and parent-reported anxiety symptoms	• Co-morbid somatic complaints • Self-reported co-morbid depressive symptoms	-

Table 6 (continued)

			Context		Mechanism				Outcome		
Author	Description	n	Participants	Setting	Theory	Frequency/ Duration	Instruments	Method	Significant	Not Significant	Impact
Grocke et al. (2009)	Mixed methods study examining effect of group music therapy on quality of life for people with a severe mental illness	17	Living in community, 10 women and seven men	5 community centers in Melbourne, Australia	Post hoc: Disclosure	10 weekly sessions, with 8 at one hour length	Bongo, djembes, wind chimes, xylophone, other percussion	Singing familiar and preferred songs, facilitated song writing, Improvisation/ accompaniment while singing within larger intervention	Social support, health, quality of life	• Satisfaction with social support • Reduction in social anxiety • Symptom reduction	• Self expression • Ownership
Gutgsell et al. (2013)	Randomized controlled trial measuring the effect of music therapy on pain reduction in people receiving palliative care	198	Diagnosis of advanced, potentially life-limiting illness. 18 years or older, self report of pain that was 3 or greater, English speaking, alert	University Hospitals Case Medical Center in Cleveland between September 2009 and August 2011	-	Single 20 minute session	Ocean drum	Adjusted environment to calm. Use of ocean drum if patient chose it, preceding play of harp	Reduction in self report of pain	Changes in Face, Legs, Activity, Cry , Consolability Scores.	-

Table 6 (continued)

			Context		Mechanism				Outcome		
Author	Description	n	Participants	Setting	Theory	Frequency/ Duration	Instruments	Method	Significant	Not Significant	Impact
Koenig et al. (2013)	Randomized attention-placebo-controlled trial measuring the effect of music therapy on primary headache disorders in adolescents	40	Adolescents between 12 and 17 years, with a headache-related diagnosis (mean age of approximately 15) , 5 days of headache per month average, 20 males/58 females	School of Therapeutic Sciences, Heidelberg, Germany	Framework (implied): Employs phase model of psycho - therapy	Six weekly sessions within 8 weeks. 90 minutes per session, 3 family sessions for adolescent and his or her parents	Gong, percussion, djembe, kettle drum, congas, vibraphone, marimbaphone, shakers	• Receptive (vibraphone) for relaxation and imagery • Improvisation promoting expression of pain and anger • Improvisation about family if warranted	-	• Headaches • Behavioral and emotional problems • Health-related quality of life • Pain perception	-
Lagasse et al. (2014)	Randomized controlled trial measuring the effects of music therapy on enhancement of social skills in children diagnosed with autism	22	Children diagnosed with autism spectrum disorder and no dual diagnosis, ages 6-9 years old (Mean age of 7.58 years old)	Facility for children diagnosed with autism, use of large treatment room,	No explicit theoretical framework. Use of Transform-ational Design Model to inform intervention	Ten group sessions (size of 3-4), 50 minute sessions twice weekly	Drums	Round 1: • Passing and playing of instrument • Deep pressure to singing • Playing instruments together and taking turns • Movement to music • Social interaction through instrumental play, as prompted in smaller groups • Closure	• Increased joint attention with peers • Increased eye gaze towards people	• Initiation of communica-tion • Response to communica-tion • Social withdrawal behaviors	-

Table 6 (continued)

			Context		Mechanism				Outcome		
Author	Description	n	Participants	Setting	Theory	Frequency/ Duration	Instruments	Method	Significant	Not Significant	Impact
Lim (2008)	Experimental study examining the effect of personality type and musical task on self-perceived arousal	32	University students recruited from a psychology department, neither musicians nor music majors, 15 women and 17 men, with a mean age of 19.9 years	University setting in the United States	-	One single session, in an individual setting, that lasted approxi-mately 10 minutes	Hand drum	• Listen to song once • Read song lyrics while listening • Watch investigator sing and tap pulse on hand drum • Tap pulse on hand drum while singing and listening to the song	• Decreased tension arousal due to listening • Increased energy arousal when singing and rhythmically tapping	Differences between personality types and arousal level changes	-

Table 6 (continued)

			Context		Mechanism				Outcome		
Author	Description	n	Participants	Setting	Theory	Frequency/ Duration	Instruments	Method	Significant	Not Significant	Impact
Lu et al. (2013)	Randomized controlled trial measuring the effects of a group music intervention on psychiatric symmptoms and depression in patients diagnosed with schizophrenia	80	People diagnosed with schizophrenia. Many homeless/unable to live independently/lacked support. No hearing deficits or verbal communication difficulties. 59 male, 21 female	Large psychiatric nursing home with a mental health facility in Haualien, Taiwan	-	Sixty minutes twice a week for 5 weeks (total of 10 sessions)	"Percussion instruments"	• Music listening • Singing popular Taiwanese songs • Playing percussion instruments • Watching music videos • Discussions	• Immediately following treatment: Improved psychiatric and depressive symptoms in components of particular tests (MIG and UCG PAN-SS Scores) • Three month follow up: Improved scores on MIG PANSS, positive PANSS, and general PANSS	• Immediately following treatment: psychiatric and depression scores related to the following: PANSS Total score, positive PANSS, negative PANSS, PANSS general, and CDSS scores	-

Table 6 (continued)

			Context		Mechanism				Outcome		
Author	Description	n	Participants	Setting	Theory	Frequency/ Duration	Instruments	Method	Significant	Not Significant	Impact
Mac-Donald and O'Donnell (1994)	Experimental study investigating effects of a structured music workshop on musical ability, communication, and self esteem in adults diagnosed with an intellectual disability	40	Individuals with mild to moderate ID. No behavioral issues. Age range 21-37 (Mean age = 28.9 years).20 men and 20 women	Occupational Therapy Department at Lennox Castle Hospital in Glasgow, Scotland	-	Ten weekly sessions, each approximately 50 minutes	Javanese gamelan (gongs, metallophones)	• Rhythm exercises • Imitation of patterns,with space and permission given for improvisation. • When helpful, use of physical prompting by OT/Teacher. •. Opportunities to choose instrumentation	• Increase in simple rhythm production •Increase in instrumental rhythm production • Increase in communication (CASP)	• Self esteem	-
Mac-Donald et al. (1999)	Experimental study investigating effects of a structured music workshop musical ability, communication, and self-perception of musical ability	64	Individuals with mild or moderate intellectual disabilities, ranging from 17 to 58 years old (mean age = 35.63 years old)	Health care institutions in Glasgow	Post hoc: Speculation regarding arousal levels, brain plasticity, and joint attention	Ten weeks, once per week for 90 minutes	Javanese gamelan (gongs, metallophones)	• Rhythm exercises as warm up • Use of rote learning of musical patterns • Increased complexity of patterns taught in relation to clients needs	• Improvement in rhythm production • Improvement in simple rhythm production • Improvement in communication (CASP). • Improvement in self-perceived musical ability	-	-

Table 6 (continued)

			Context		Mechanism				Outcome		
Author	Description	n	Participants	Setting	Theory	Frequency/ Duration	Instruments	Method	Significant	Not Significant	Impact
Magee and Davidson (2004)	Grounded theory study examining music therapy with clients diagnosed with multiple sclerosis	6	Individuals with multiple sclerosis, four females and two males, 5 of British descent and one of Afro-Caribbean descent, Age range was 31-59. Participants displayed mild to moderate cognitive deficits	Medical facility for neurodisabil-ities (residential and daycare) in UK.	-	Mean number of 18 sessions in an individual setting, approximate ly 45 minutes long	Windchimes, percussion, drums	• Open improvisations based on Western harmonic progressions and modes • Therapist on piano, client on drum.	-	-	Emotional expression and self awareness through physical experience

Table 6 (continued)

			Context		Mechanism				Outcome		
Author	Description	n	Participants	Setting	Theory	Frequency/ Duration	Instruments	Method	Significant	Not Significant	Impact
Mandel et al. (2007)	Randomized controlled trial measuring the effects of music therapy on health-related outcomes in cardiac rehabilitation	68	People participating in posthospitaliza-tion cardiac rehabilitation treatment program for various coronary issues Ages 30-80	Outpatient cardiac rehabilitation program in Ohio	-	Group setting, 1.5 hour session every other week. Minimum of 4 and maximum of 6, with clients opting to attend other music therapy sessions on the in between weeks	Hand drums, percussion instruments	• Song discussion • "Live music making" with percussion instruments • Music assisted relaxation and imagery (MARI)	Changes in systolic blood pressure pre to posttreatment	Changes in systolic blood pressure pre to posttreatment.	-
Moham-madi et al. (2011)	Randomized controlled trial measuring the effect of group music therapy on stress, anxiety, and depression levels in people who live in a nursing home setting	19	Broad range of diagnoses (dementia, chronic physical disease (Rheumatoid arthritis, cerebral vascular disease), ages 65 years and older, (mean = 69.69.68 years). 9 Female, 10 male	Long term care facility in Iran	-	Ten weely sessions, 1.5 hours in length	"Percussion instruments," daf, tombak, maracas, tambourine, xylophone, metallophone, Orff instruments, santur	• "Rhythmic instrument playing"/improv isation • Persian singing • Rhythmic movement • musical and verbal interaction •accompanying • songwriting	Reductions in stress, anxiety, and depression according to the Depression Anxiety Stress Scale	-	-

Table 6 (continued)

			Context		Mechanism				Outcome		
Author	Description	n	Participants	Setting	Theory	Frequency/ Duration	Instruments	Method	Significant	Not Significant	Impact
Preti and Welch (2011)	Grounded theory and thematic analysis study regarding the impact of a live music program on pediatric patients and their caregivers	308	162 children, 146 caregivers (observed), 14 children and 22 caregivers (interviewed), participants: MS diagnosis. 4 females and two males. One participant Afro-Carribbean and remaining British Caucasian. Range of time from diagnosis was 3 to 25 years. Verbal communication but some dysarthria. Mild to moderate cognitive deficits	Pediatric hospital in Italy. Ongoing music since 2003, 45 hours per week	-	Single session of approx-imately 40 minutes in length	Drums, tambourines, castanets, maracas, egg shakers, rain sticks, bell sticks, tone block, rhythm sticks, cymbals	• Percussion instruments played by children to accompany singing and playing of other instruments by musicians • Musicians sometimes imitate playing of participant with same instrument the participant had. Use of familiar/ preferred song repertoire. • Culturally diverse songs • Repetitive song forms and incremental lyric in songs	-	-	• Direct interactions between child and musician more likely in public, group environments with other children present • Parents sometimes acting to facilitate child/ musician interactions • Importance of familiar music

Table 6 (continued)

			Context		Mechanism				Outcome		
Author	Description	n	Participants	Setting	Theory	Frequency/ Duration	Instruments	Method	Significant	Not Significant	Impact
Raglio et al. (2008)	Experimental study examining the effect of music therapy on the treatment of behavioral and psychiatric symptoms of dementia	59	Age range of 73-95 (Mean age = 85), 9 male and 50 female, diagnosis of dementia: Alzheimer's or vascular type	Northern Italy Nursing home facilities: Sospiro Foundation facility, Ulivi facility, and Piccinelli foundation	-	Three cycles of ten sessions, 30 minutes	"Rhythmical instruments"	Facilitation of nonverbal (musical) behavior to stimulate cogntion. Therapist's use of attunement to musical expression	Reduction in Dementia-Related behaviors (BPSD), specific to: • delusions • agitation • anxiety • apathy • irritability • aberrant motor activity • nighttime behavior disturbances. All were also significant at 2 and 4 month follow ups.	No change in Mini Mental State Examination	-

Table 6 (continued)

			Context		Mechanism				Outcome		
Author	Description	n	Participants	Setting	Theory	Frequency/ Duration	Instruments	Method	Significant	Not Significant	Impact
Särkämo et al. (2013)	Randomized controlled trial measuring the effect of regular musical activities on cognition, emotion, and social factors in people diagnosed with dementia	30	Aged 65 or over, diagnosis of dementia, no significant hearing impairment, no receptive language problems	Helsinki and Espo Finland: activity and day centers	-	Twelve sessions (twice weekly, 30 minutes), provided in recreation rooms of facilities	Triangles, clappers, maracas, handbells, "color sound bells" (push bells)	• Gross and fine motor movements performed to music • Instrumental play/accompaniment, listening to popular music, singing with instrumental accompaniment • Themes that included reminiscence, relaxation, and stimulation • Visual cues (pictures, album covers) to promote reminiscence • Open communication	• Improved cognitive function: Short term recall	Cortisol level	-

Table 6 (continued)

			Context		Mechanism				Outcome		
Author	Description	n	Participants	Setting	Theory	Frequency/ Duration	Instruments	Method	Significant	Not Significant	Impact
Sung et al. (2012)	Experimental study measuring the effect of a group music intervention to reduce anxiety and agitation in older adults diagnosed with dementia within an institutional setting	60	65 years old or older, diagnosed with dementia, with a mild to moderate level of impariment (mean age of 80.43 years) 36 female and 24 male	Residential care facility in Taiwan	-	Twice a week for 6 weeks, 30 minute per session	"Percussion instruments"	• Five minute stretching/ breathing warm up • 20 minutes of familiar music with percussion accompaniment • Five minute cool down with stretching/ breathing to "soft music"	Lower anxiety	Agitation	-

Table 6 (continued)

			Context		Mechanism				Outcome		
Author	Description	n	Participants	Setting	Theory	Frequency/ Duration	Instruments	Method	Significant	Not Significant	Impact
Wachi et al. (2007)	Experimental study measuring the effect of recreational music making on natural killer cell activity, cytokines, and mood states in corporate employees	40	Healthy males working in a corporate setting worked in R&D, marketing, and administration	Yamaha Health Management Center in Hamamatsu, Shizuoka prefecture Japan	-	Single intervention of 60 minute length	Tubanos, claves, tambourines, djembes, gathering drums, buffalo drums, apple shakers	Use of instruments to elicit laughter, self-expression, and a sense of togetherness: • Introduction • Shaker pass with tempo increase to elicit laughter • Basic drumming instruction • Name playing on instrument • Facilitation of entrainment • Participant initiation of rhythms • Nonverbal expression on instruments • Guided imagery with live drumming • Closure	• NK cell activity (increased for low levels and decreased for high levels) for particular NK cells • Genetic expression changes for stress indicators • Improved mood	• NK cell activity for other particular cell types	-

Table 6 (continued)

			Context		Mechanism				Outcome		
Author	Description	n	Participants	Setting	Theory	Frequency/ Duration	Instruments	Method	Significant	Not Significant	Impact
Walworth et al (2008)	Experimental study measuring the effects of music therapy on quality of life indicators, medications administered and hospital length of stay for patients undergoing elective surgical brain procedures	27	Admission for medical procedure (craniotomy or craniectromy). Age range 8-73 years (M = 46.5), 12 males and 15 females	Talahassee Memorial Hospital	-	A 20-30 minute session pre-operation, and approximately 30 minute sessions post-operation for every day they were still in the hospital.	"Rhythm instruments"	• Occuring in hospital room. • Patient-preferred, live music. • Family members could join in. • Singing, playing instruments, and listening were all choices offered. • Lyric analysis with verbal processing • Songwriting • Progressive Muscle Relaxation • Guided imagery	• Anxiety reduction • Increased positive perception of hospitalization • Increased relaxation • Reduced stress	Positive mood change • Change in pain level • Change in medication use • Change in length of stay	-

Table 6 (continued)

			Context		Mechanism				Outcome		
Author	Description	n	Participants	Setting	Theory	Frequency/ Duration	Instruments	Method	Significant	Not Significant	Impact
Wormit et al. (2012)	Mixed methods study evaluating a treatment manual for music therapy in adult outpatience oncology care	20	Participants diagnosed with cancer(14 w/ breast cancer, 2 with ovarian cancer, and 4 with other cancer types), 19 women and one man in study, , 19 to 79 years of age, emotional and psychological distress, no primary psychiatric disorder	Center for pain therapy and palliative medcine in Heidelberg. 20 sessions, 50 minutes each	-		Gong, kettledrum, vibraphone	• Receptive music using live piano or vibraphone, with free association for affect. • Expressing symptoms of distress, everyday life situations, personality characteristics, and verbal constructs through musical improvisation	• Increased overall therapy outcome • Increased global quality of life • Decreased pain within past four days	-	Case study provided complemen-tary stance to measures of significance

Outcome Domains. The investigator located a broad range of outcomes discussed within studies (see Table 6). Reduction of anxiety (n = 4), reduction of stress (n = 3), and increase in cognitive function. were most common. All other outcomes were mentioned once. Associated outcome domains were social, communicative, psychological, cognitive, or physiological in nature (as related to pain). The investigator located no specific motor-related outcomes.

Themes in Individual Study Mechanisms. Mechanism codes included multiple interacting components. The investigator located general themes in the following mechanism components:

- Frequency/Duration: Twenty-two articles (n = 22) used multiple sessions, ranging from two sessions to 32 sessions, over time. Seven (n = 7) studies employed a single intervention session.
- Theory: Of the 29 total studies evaluated (N = 29), two studies provided an explicit theoretical framework. An explicit theoretical framework was understood through Robb's definition (2012), where the intervention is defined to target the "potential mediators" (p. 4) that may affect the client outcome. Currie (2012) used the Doing Anger Differently framework, with which he has established both a psychological model (Currie, 2008a) and has detailed the percussion-related program (Currie, 2008b). Ghetti (2011) employed the framework of Active Music Engagement (Robb et al., 2008), both with and without Emotional Approach Coping (Austenfeld & Stanton, 2004). A total of seven other studies (n = 7) described the a priori use of a theory that supports the intervention process (Albornoz, 2011; Bensimon et al., 2012; Chu et al., 2013; Gattino & Riesco, 2011; Goldbeck & Ellerkamp,

2012; Koenig et al., 2013; Lagasse, 2014), but did not explicitly describe how the theory informed the intervention or affected potential mediators. A total of three studies provided theories post hoc (Bensimon et al., 2012; Grocke et al., 2009; MacDonald et al., 1999). No theoretical framework was implemented more than once.

- Instruments Used: The investigator counted the instrumentation used in the collective studies (see Table 7). Many studies referred to instrumentation in a general fashion (e.g., "rhythm instruments," "percussion."). Of the specific instruments mentioned, auxiliary percussion types (e.g., "cabasa," "egg shaker") were most commonly mentioned (n = 41). Investigators reported drum types second most (n = 39).

Table 7

Instruments by Frequency of Mention

Instruments			Total
Percussion			41
shakers and rattles		14	
not specified	5		
specified	9		
bells (pitched and unpitched)		10	
not specified	3		
specified	7		
concussion instuments		7	
rhythm sticks	1		
claves	2		
castanets/"clappers"	4		
blocks (wood, tone, temple)		2	
scrapers		2	
triangles		2	
rainsticks		2	
metal - unspecified		1	
wood - unspecified		1	
Drums			39
not specified		6	
Hand drums		13	
large hand drums-specified	8		
unspecified	5		
tambourines		4	
snare/tom/related drums		1	
bongo drums		1	
sound shapes		1	
bass drums		1	
kettledrum		2	
frame drums		2	
not specified	0		
specified	2		
ocean drum		1	
goblet drums		2	
tamborim		1	
tabla		1	
log drums		1	
table/gathering/floor drums		2	

Instruments (continued)			Total
Pitched Percussion (excluding bells)			11
xylophones		2	
metallophones		1	
"Orff" unspecified		1	
marimbas		1	
gamelan metallophones		2	
santur		1	
vibraphones		2	
bass bars		1	
Unspecified Percussion			15
general	12	12	
"rhythm instruments"	3	3	
Cymbals			2
unspecified		2	
Chimes			2
wind chimes		2	
not specified		0	
Gongs			4

- Proportion of Percussion Use Within Intervention: Two studies (*n* = 2) used percussion during a complete intervention in at least one of the treatment groups (Lim, 2008; Gadberry, 2011). A total of 21 studies reported using percussion for more than 50% frequency of the described intervention (Albornoz et al., 2011; Bensimon et al., 2012; Bittman et al., 2003; Bittman et al., 2009; Currie, 2012; Gattino & Riesco, 2011; Ghetti, 2011; Goldbeck & Ellerkamp, 2012; Grocke et al., 2009; Gutgsell et al., 2013; Koenig et al., 2013; MacDonald & O'Donnell, 1994; MacDonald et al., 1999; Magee & Davidson, 2004; Mohammadi et al, 2011; Preti & Welch, 2011; Raglio et al., 2008; Särkämo et al., 2013; Sung et al., 2012; Wachi et al., 2007; Wormit et al., 2012). A total of six studies used percussion to a limited extent during the intervention process (Chen et al, 2009; Chu et al., 2013; Lagasse, 2014; Lu et al., 2013; Mandel et al., 2007; Walworth et al., 2008).
- Music Methods Using Percussion: The investigator counted the mentions of different types of music therapy methods that specifically included percussion instruments. Eleven studies (*n* = 11) discussed the use of improvisation. Nine studies (*n* = 9) employed interventions that included musical accompaniment with percussion. Study investigators also used re-creative, guided interactive play processes (*n* = 9), such as percussion-oriented games. Six studies (*n* = 6) discussed the use of percussion-related receptive methods. Five studies (*n* = 5) did not specify how percussion instruments were used (e.g., "live music making," "playing instruments"). While investigators mentioned other methods, those methods were not explicitly linked with percussion instruments.

- Music Methods Not Using Percussion: The investigator located procedures using music that did not include percussion: Receptive methods (*n* = 7) including relaxation, progressive muscle relaxation, imagery processes, and music video watching; movement to music (*n* = 4); singing (*n* = 3); song discussion/lyric analysis (*n* = 2); songwriting (*n* = 2); therapist accompaniment (*n* = 2); and teaching/acclimation to instruments (*n* = 2).
- Methods Incorporated Into Music Experiences: The investigator located components within interventions that were added to music experiences: Verbal processing, discussion, and communication (*n* = 7); use of other art media (*n* = 2); use of tactile and visual props (*n* = 2); inclusion of a theoretical underpinning (*n* = 2), including psychodynamic and cognitive behavioral therapy theories; physical touch (*n* = 1); adjusting the environment to be more calm (*n* = 1); physical prompting (*n* = 1); use of themes for sessions (*n* = 1); choosing instruments (*n* = 1).

Context-Mechanism-Outcome Configurations: Chains of Evidence. The investigator analyzed outcomes encountered within particular contexts (including settings and participants) in order to locate those outcomes that were both common and successfully met. The following descriptions of preliminary chains, describing common outcomes, are organized by population categories: (a) mental health, (b) medical and palliative, (c) intellectual disabilities, (d) autism, (e) geriatric and dementia, (f) non-clinical populations, and (g) people who experience migraine headaches.

- Outcomes within mental health settings included reduction in depression (for clients diagnosed with schizophrenia [Lu et al., 2013], depression [Albornoz et al., 2011], or emotional/behavioral diagnoses [Bittman et al., 2009]), and reduction in anger (for clients diagnosed with reactive aggression [Currie, 2012], post traumatic stress disorder [Bensimon et al., 2012], or emotional/behavioral diagnoses [Bittman et al., 2009]).
- Outcomes for medical and palliative settings included pain reduction (in participants diagnosed with cancer [Wormit et al., 2012], receiving a kidney or liver transplant [Ghetti, 2011], or receiving palliative care [Gutgsell et al., 2013]), and indicators of stress reduction (through changes in systolic blood pressure by participants who were undergoing cardiac rehabilitation [Mandel et al., 2007] or through self report by participants who were receiving medical support for a craniotomy or craniectomy [Walworth et al., 2008]).
- Interventions for clients with intellectual disabilities promoted successful outcomes related to increased rhythm production, communication, and self – esteem (MacDonald & O'Donnell, 1994; MacDonald et al., 1999).
- Outcomes promoted for clients diagnosed with autism included joint attention, eye gaze, and non-verbal communication (Gattino & Riesco, 2011; Lagasse, 2014).
- Outcomes for clients living in geriatric facilities included anxiety reduction (with participants who had a range of diagnoses (Mohammadi et al., 2011) or with participants diagnosed with dementia (Raglio et al., 2008; Sung et al.,

2012)) and increased types of cognitive functioning for participants diagnosed with dementia (Särkämo et al., 2013; Sung et al., 2012).

- Non-clinical populations included university students, health care employees, and corporate employees. Some studies promoted outcomes for these non-clinical populations, including reduced anxiety and stress levels (Bittman et al., 2003; Gadberry, 2011; Wachi et al., 2007).

The investigator also linked Context-Mechanism-Outcome Configurations (CMOC's) according to the data (see Figure 4). Based on the evaluated studies, six plausible propositions surfaced. The resulting configurations occurred within community educational settings (MacDonald & O'Donnell, 1994; MacDonald et al., 1999), educational settings, (Currie, 2012), employment settings (Bittman et al., 2003; Wachi et al., 2007), and linked to health care settings (Albornoz et al., 2011; Bensimon et al., 2012; Bittman et al., 2009; Mandel et al., 2007; Wormit et al., 2012).

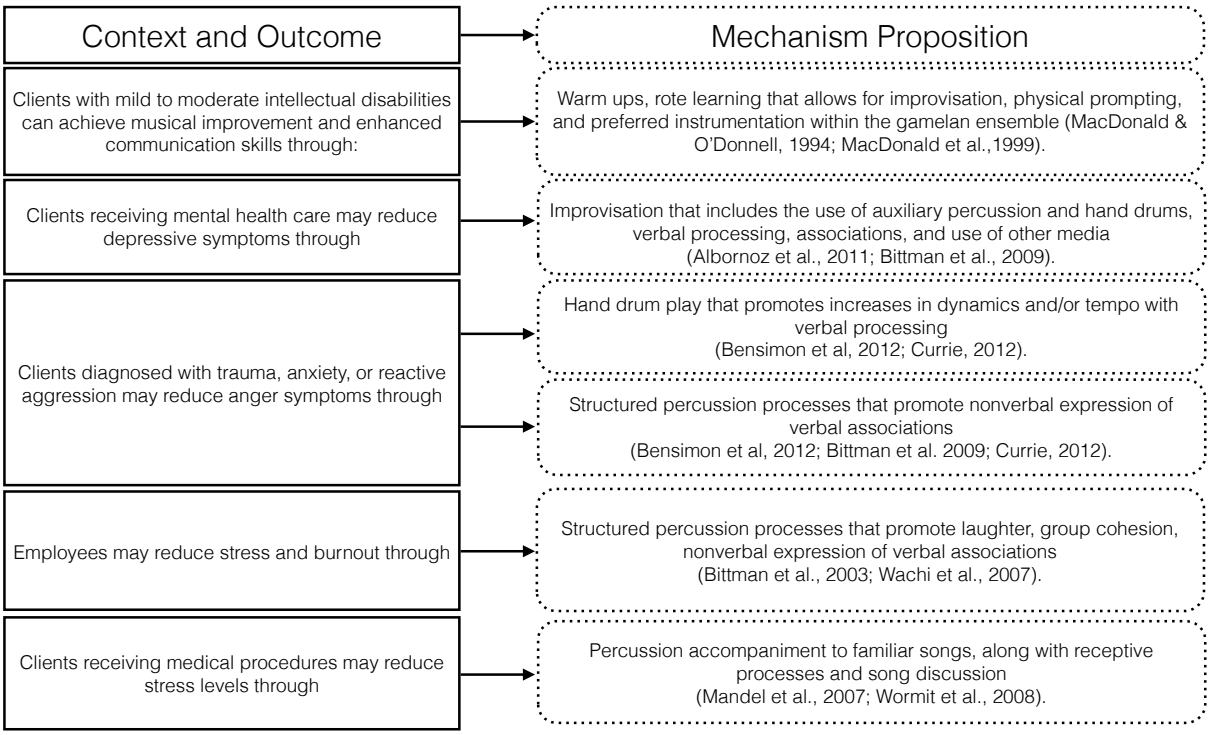

Figure 4. Propositions of Plausible CMOC's

CHAPTER V

Discussion

The purpose of this study was to conduct a realist synthesis-type systematic review of the literature regarding the use of percussion in therapy. This purpose guided a review process that allowed the investigator to better understand the reporting quality of studies using percussion interventions through published evaluation tools, and to better understand what interventions produce effective or impactful outcomes in particular contexts. Through review of an established database (Matney, in press) and inclusion/exclusion criteria, the investigator established a set of context-mechanism-outcome configurations that were effective and/or impactful. While the review did provide some insight into plausible theory development, the results were general. This section will discuss (a) the quality of identified studies; (b) common instrumentation used within studies; (c) common general outcomes, (d) context-mechanism-outcome configurations presented by the literature, (e) impact on clinical practice, (f) impact on pedagogy, (g) study limitations, and conclusions. Many sections will include potential areas for future study as applicable to that discussion.

Quality of Identified Studies: Evaluation of Experimental, Qualitative, and Mixed-Methods Studies

The investigator for this study insisted that either internal review board (IRB) compliance or report of participant consent was a mandatory ethical consideration. The demonstration of 17 studies out of 55, prior to screening, lacking report of either IRB compliance or participant consent presents a disturbing trend in music intervention reporting. While some of these studies may have actually used IRBs and participant consent procedures in their study, research consumers can not be assured of this fact without transparent reporting. Future studies should include reporting of ethical procedures as a priority. Music

therapy journals in the United States appear to currently require reporting of IRB and consent procedures when participants are included in the study as part of the submission process. The investigator for this study also excluded any intervention report that included an allocation where the largest treatment group size was more than 150% larger than the smallest group size. Systematic reviews risk compounding biases when original studies are not checked for validity (Boutron et al., 2005). Results suggest that more than eight percent of experimental studies evaluated used distributions that likely promoted outcome bias. Future music intervention research, whether related to percussion or otherwise, should strongly consider the importance of proportionate allocation into treatment groups.

Results from experimental study evaluation (see Table 4) suggest that there exists a lack of (a) randomization procedure reporting; (b) detailed information regarding group allocation; (c) details regarding the intervention, most specifically with instrumentation used; (d) assessment of participant adherence to intervention, (e) data assessor blinding, (f) reporting of methods to avoid ascertainment bias in those instances where data assessor blinding does not occur, (g) consistent follow up schedules, and (h) use of intention to treat principle. Results for the 23 eligible experimental studies suggest implementation and/or reporting procedures that are limited in transparency, detail, and reduction in bias. Future studies should seek to employ study methods (e.g., concealment of treatment group, blinding when possible) and reporting procedures (e.g., detailing the type of randomization process used, more specific information about percussion instruments used) that facilitate easier replication and easier transfer to clinical practice. This task can be better accomplished by using checklists before beginning a particular study.

Results from evaluation of qualitative studies (n = 3), using the COREQ evaluation tool (Tong et al., 2007) also suggest a need for further transparency in particular areas. Intervention reporting would benefit from a greater focus on the following: (a) who conducted interviews, (b) intervention facilitator's experience and training with population, (c) discussion of recruitment or how participants were approached for study, (d) clarity regarding any withdrawals from study, (e) clarity regarding reporting of others present during session, (f) interview duration, (g) reporting of data saturation, (h) participant feedback on transcriptions or results, and (i) coding tree reporting.

Mixed-methods studies (n = 3) were evaluated using Pluye et al. (2009). Evaluation results provide insight into current reporting trends. Studies provided purposes, but none provided focused research questions. The investigator did not locate detailed procedure reporting in one of the studies. Even in the case of exploratory studies, research questions help guide the research consumer to better understand study results. Given that two studies employed parametric statistics, it would appear that the studies measured particular outcomes, and therefore would allow for focused research questions.

Based on the above findings, results suggest that music intervention reporting for percussion-related studies lacks methodological rigor, as well as detailed and transparent reporting of methods in many areas. This finding appears similar to findings in Robb (2011) and Burns (2012), where a lack of reporting placed the reliability and validity of studies at risk. The investigator recommends the use of checklists and evaluation tools before studies are conducted, as well as during the writing process.

Investigators have commonly conducted realist synthesis studies to examine the complexity of interventions that have previously been considered simple. For example, an antiretroviral therapy that has been considered effective in clinical trials may encounter issues

regarding client adherence. This type of study largely differs from music interventions that readily acknowledge material, psychological, relational, social, and other factors. For this reason, the investigator conducted a realist synthesis that acknowledges the interaction of many factors in a particular context. The present investigator therefore acknowledges the unique configurations presented in this study.

Common Instrumentation within Studies

The instrumentation used in interventions evaluated for this study (see Table 7) focus primarily on types of auxiliary percussion, types of drums, and pitched percussion instruments. The result is not surprising, given that these studies were derived from a larger database that had a similar instrumental focus (Matney, in press). Interestingly, instrumental frequencies shifted in this study to an emphasis on auxiliary percussion. This may suggest that the particular contexts where these studies tested interventions were perceived as needing more readily portable instrumentation. For example, studies in the medical setting tended to focus on "rhythm instruments" or "percussion instruments" (Ghetti, 2011; Mandel et al., 2007; Walworth et al., 2008), perhaps due to their portability.

Particular CMOC's (Figure 4) suggest that instrumentation may play a vital role in intervention mechanisms. Investigators studied the use of dynamic hand drumming and verbal processing of the event to facilitate expression of anger (Bensimon et al., 2012; Currie, 2012). This process may speak to the physical nature of playing hand drums with force, and to the voluminous auditory feedback one receives when providing that force. In another configuration, researchers studied the use of gamelan instrumentation with clients who were diagnosed with intellectual disabilities (MacDonald & O'Donnell, 1994; MacDonald et al., 1999). Other factors promoting musical and communication development included acclimation, rote learning, improvisational flexibility that meets clients at their developmental

level and creative interest, and the use of preferred instrumentation. While the teaching process for gamelan was adapted, the focus on rote learning, prompting, and improvisational flexibility are common features of the overall gamelan ensemble. Client choice of instrumentation, such as in Ghetti (2012) and MacDonald et al. (1999), speaks to the promotion of client choice in various settings.

Outcomes

The range of effective and impactful outcomes in this study (see Table 4) provides opportunities for further study. However, there appears to exist only one study replication within the evaluated articles (MacDonald & O'Donnell, 1994; MacDonald et al., 1999), and few study outcomes can be linked to similar contexts and mechanisms. Future studies may seek to replicate outcomes in similar environments, with more clearly articulated theoretical frameworks. For example, several studies promoting relaxation as a primary or secondary outcome used percussion instruments, including the ocean drum, vibraphone, and a sub-contra C bass bar. The implementation of these instruments was different in each study, the participant populations were different, and other covariates (e.g., cues, verbal processes, environmental factors) were present in each study. Future studies may take into account the similarities between these instruments (e.g. pitched percussion in two cases, potential for legato sounds for all three cases) and their differences (e.g., rhythmic versus a-rhythmic). In some cases, general outcomes were evaluated using different measurement tools. For example, stress reduction was measured physiologically or through self-report. Depression was measured by self-report or by evaluator observation of behaviors. Differentiation in measurement tools reduces the potential for consistent measurement across studies.

Some outcome domains appear scant in this study. The investigator did not locate any primary outcomes specifically related to the motor domain. Some studies did use movement

within interventions, but in the rare instances where percussion and movement were linked, there was not a specific motor outcome linked to the mechanism. Percussion instruments have the potential to promote gross motor and fine motor development (Matney, 2007), but effectiveness has not been demonstrated through rigorous experimental, qualitative, or mixed-methods studies. Future research may focus on this domain. The investigator located no interventions in eligible studies promoting speech outcomes. Where communication focuses on the meaning of language, speech focuses on the motor components of language, such as articulation and prosody. Preliminary study indicates potential for kinesthetic reinforcement to promote speech outcomes (Cohen, 1993). However, further study using larger sample sizes and a more equal allocation distribution would contribute to the current evidence base.

Context-Mechanism-Outcome Configurations

Individual CMOC's (see Table 6) demonstrate the diversity of contexts, outcomes, and connective mechanisms prevalent within percussion-related music interventions. Diversity of individual CMOC's provided serious challenge to the creation of evidence chains. The current mechanism propositions (see Figure 4) are to be understood as plausible but tentative theoretical frameworks. Authors have described the lack of theoretical frameworks within music intervention literature (Burns, 2012; Robb, 2012). The proposed CMOC's contribute to preliminary theoretical frameworks for percussion interventions that promote specific outcomes. However, further research will be required to measure the fidelity of these propositions. For example, a researcher may wish to study an intervention that focuses on the expression of anger through hand drumming, dynamic ranges, and verbal processing within a correctional facility (see Figure 4).

Impact on Clinical Practice

This study contributes to clinical practice by examining the effective and impactful outcomes related to percussion-related music interventions. Where Matney (in press) answered questions related to therapeutic application and therapeutic function, this study sought to report the effectiveness of particular interventions in particular contexts. Individual CMOC's (see Table 6) allow clinicians to examine outcomes related to particular populations and settings. Chains of evidence (see Figure 4) provide a tentative set of propositions that may be applied in clinical practice. Clinicians can take these preliminary theoretical frameworks and modify according to their own contexts.

Impact on Pedagogy

This study contributes to a greater understanding of effective percussion use in music therapy, and therefore provides a resource to music therapy educators. Authors have described the need for more detailed percussion pedagogy that promotes a relevant understanding of percussion use in therapy (Knight & Matney, 2012; Matney, 2007; Scheffel & Matney, 2014). Matney (in press) promotes a greater awareness of common instrumentation used, population trends, therapeutic applications and therapeutic functions. Educators may use this study to discuss interventions that have promoted effective outcomes. Furthermore, educators may also use this study to demonstrate current challenges related to study rigor and transparency.

Limitations of Study

This study encountered several limitations related to the data, investigator experience, and use of reviewers and stakeholders. Each of these limitation factors is discussed below.

Data. The investigator relied upon peer-reviewed, published data and particular inclusion/exclusion criteria for this study. While the delimitations provide an increased focus and relevance for the research questions asked, it may also risk susceptibility to publication

bias. Furthermore, exclusion criteria resulted in a limited amount of studies. The subsequent context-mechanism-outcome configurations for various populations are therefore limited in scope, particularly when taking into account the many mechanism combinations occurring within each individual study. Lastly, authors seldom discussed theoretical frameworks or mechanisms that explained their study outcomes. This problem appears to occur in other realist synthesis work as well (Kane et al., 2010). Resulting theory development provides a preliminary step towards percussion-related theoretical frameworks, but their current fidelity should be considered in a conservative light.

Investigator Experience. The investigator for this study had limited experience in using appraisal tools and conducting systematic reviews outside of this study. Lack of experience may compromise the reliability of a study. In order to safeguard the appraisal process, a research assistant rated 20.69% of studies, resulting in a 91.66% agreement. However, the proportion of the appraisal, given the small amount of studies, may not accurately reflect potential biases in appraisal. In order to safeguard the research process, the investigator used systematic review guidelines (Gough, Oliver, & Thomas, 2012; Hanson-Abromeit & Sena Moore, 2014).

The investigator also has personal experiences as a clinician, educator, and musician that may play a role in study outcomes. The investigator, as a music therapist and percussionist, holds a vested interest in better understanding the therapeutic effectiveness of percussion instrumentation. This interest can be understood as a strength, or can be understood as a potential bias that affects the processes and products related to this study.

Reviewers and Stakeholders. One investigator conducted this study. A research assistant evaluated six articles by using the evaluation tools relevant to each individual study. The investigator completed all other reviews, including context-mechanism-outcome

configurations. Many realist synthesis studies incorporate multiple reviewers, so that numerous perspectives inform the review process (Brown et al., 2014; Jackson et al., 2014; Kane et al., 2010). Furthermore, many systematic reviews, including realist synthesis studies, seek input from stakeholders such as clients, clinicians, caregivers, and policy makers. A part of the review process may also include contacting the authors of studies to insure a greater understanding of each individual study (Brown et al., 2014). This study did not collaborate with stakeholders or authors. Given the focus on the use of percussion, input and review from clinicians and other researchers would have likely increased the depth and generalizability of theoretical development. The scope of this particular study would likely have benefitted from greater input from all the communities that are impacted by music therapy services. Therefore, results leading to theoretical development should be conservatively read.

Conclusions

The use of percussion in therapy appears prevalent in both clinical practice and in the literature, according to prior research. While authors have speculated on reasons as to how and why percussion has been used, the investigator of this study sought to better understand how and why percussion-related interventions may or may not be effective. The purpose of this study was to conduct a realist synthesis-type systematic review of the literature regarding the use of percussion in therapy. In general, the results of this study indicate that (a) studies lack rigor and transparency in particular areas, (b) individual percussion-related music interventions have demonstrated effectiveness, and (c) few studies exist that have tested the efficacy of particular context-mechanism-outcome configurations. In light of these summations, future study may include (a) evaluating and providing tools for the intervention reporting process, (b) percussion-related intervention studies focused on domains with limited

representation (e.g., percussion use in motor development), (c) replication of current studies found in this systematic review, and (d) testing of CMOC propositions for fidelity.

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Appendix A – CLEAR NPT Evaluation Tool

CLEAR NPT Evaluation Form for Randomized Studies

Study being evaluated: _____

1. Was the generation of allocation sequences adequate?
Yes No Unclear

2. Was the treatment allocation concealed?
Yes No Unclear

3. Were details of the intervention administered to each group made available?
Yes No Unclear

4. Were care providers' experience or skill in each arm appropriate?
Yes No Unclear

5. Was participant adherence assessed quantitatively?
Yes No Unclear

6. Were participants adequately blinded?
Yes No, because blinding is not feasible
No, although blinding is feasible
Unclear

6.1 If participants were not adequately blinded…

6.1.1 Were all other treatments and care the same in each randomized group?
Yes No Unclear

6.1.2 Were withdrawals and lost to follow-up the same in each randomized group?
Yes No Unclear

7. Were care providers or persons caring for the participants adequately blinded?
Yes No, because blinding is not feasible
No, although blinding is feasible
Unclear

7.1 If care providers were not adequately blinded

7.1.1 Were all other treatments and care the same in each randomized group?
Yes No Unclear

7.1.2 Were withdrawals and lost to follow-up the same in each randomized group?
Yes No Unclear

8. Were outcome assessors adequately blinded to assess the primary outcomes?
Yes No, because blinding is not feasible
No, although blinding is feasible
Unclear

8.1. If outcome assessors were not adequately blinded, were specific methods used to avoid ascertainment bias
(systematic differences in outcome assessment)?
Yes No Unclear

9. Was the follow up schedule the same in each group?
Yes No Unclear

10. Were the main outcomes analyzed according to the intention-t-treat principle?
Yes No Unclear

Comments:

Appendix B – COREQ Checklist

COREQ Evaluation Report

Domain 1: Research team and reflexivity

1. Which author(s) conducted interview or focus groups?

_____

2. What were the researchers credentials?
   COREQ guidelines.pdf

_____

3. What was the interviewers occupation at the time of the study?

_____

4. Was the researcher male or female?

_____

5. What experience or training did the researcher have?

_____

6. Was a relationship with participants established prior to study?

_____

7. What did the participants know about the researcher?

_____

8. What characteristics were reported about the interviewer/facilitator?

_____

Domain 2: Study design

9. What methodological orientation was stated to underpin the study?

_____

10. How were participants selected?

_____

11. How were participants approached?

_____

12. How many participants were in the study?

_____

13. How many people refused to participate or dropped out? Reasons?

_____

_____

14. Where was the data collected?

_____

15. Was anyone else present besides the participants and researchers?

_____

16. What are the important characteristics of the sample?

_____

17. Were questions, prompts, guides provided by authors? Was it pilot tested?

_____

18. Were repeat interviews carried out? If yes, how many?

_____

19. Did research use audio or visual recording to collect data?

_____

20. Were field notes made during and/or after interview or focus group?

_____

21. What was the duration of the interviews or focus group?

_____

22. Was data saturation discussed?

_____

23. Were transcripts returned to participants for comment and.or correction?

_____

Domain 3: Analysis and findings

24. How many data coders coded the data?

_____

25. Did authors provide a description of the coding tree?

_____

26. Were themes identified in advance or derived from the data.

_____

27. What software, if applicable, was used to manage the data?

_____

28. Did participants provide feedback on the findings?

_____

29a. Were participant quotations presented to illustrate the themes/findings?

_____

29b. Was each quotation identified in relation to participant?

_____

30. Was there consistency between the data presented and the findings?

_____

31. Were major themes clearly presented in the findings?

_____

32. Is there a description of diverse cases or discussion of minor themes?

_____

Appendix C

Mixed Methods Appraisal Checklist

Box 1.

Question: Analysis of all reviews

1. Review question and/or objective and/or activity
   - 1.1 Mention of review questions with(out) objectives. _____
   - 1.2 Mention of review objectives (no explicit question) _____
   - 1.3 Description of review activities (no explicit questions or objectives) _____
2. Review perspective
   - 2.1 Exploratory (generate new ideas, concepts, frameworks, models) _____
   - 2.2 Confirmatory (test hypothesis or proposals) _____
   - 2.3 Both exploratory and confirmatory _____

Synthesis: Analysis of all reviews

1. Narrative synthesis

- 1.1 Procedure described (at least one paragraph) _____
- 1.2 Procedure type mentioned _____
- 1.3 Procedure not mentioned, deduced from findings. _____

2. Type of narrative synthesis

- 2.1 Key findings: at least one sentence per study or group of studies _____
- 2.2 Summaries: at least one paragraph per study (narrative _____
- 2.3 Content areas: findings presented according to broad ca _____
- 2.4 Content analysis or thematic analysis _____
- 2.5 Other procedure _____

3. Quantitative Synthesis

- 3.1 Descriptive statistics _____
- 3.2 Statistical test _____

4. Integration of qualitative findings and quantitative results
   - 4.1 Assimilation stances _____
   - 4.2 Complementary stances _____
   - 4.3 Divergence stances _____