

Full-Length Article

A Content Analysis of 10 years of *Music and Medicine*

Erik Baumann¹¹Private Practice, Lima, Peru

Abstract

A content analysis of the articles published over the last decade in *Music and Medicine* is proposed. This article follows a model, constructed prior by Cheryl Dileo conceived originally 1991, and updated in 2013 [1]. New categories for classification are proposed, as well as a keyword cluster analysis performed to glean some understanding of the contents of the 323 articles published in this journal since its inception in 2009.

Keywords: *music and medicine, journal, analysis, keyword clusters, categories, classification.*

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Introduction

The main purpose of this article is to gain perspective and insight related to the content of *Music and Medicine*, an interdisciplinary peer reviewed journal that has been published quarterly over the course of the past 10 years. In 2013, as the journal embarked upon its 5th year anniversary, “a proposed model for identifying practices” occurred at which time, a content analysis of the journal’s first 4 years ensued [1]. The result of the analysis led to a suggested model that encapsulated the content analysis of the journal’s first 4 years of publications.

To propose a model that encases a very broad field is extremely challenging, and there are many routes one can take, especially if we consider that within the 10-year tenure of *Music and Medicine*’s existence, a total of 323 articles were published. Therefore, to mark this anniversary, and as a way to have some insight and continuity within this journal’s aims and contents, Dileo’s proposed model [1] served as a useful jumping off point, and one I sought to follow as much as possible, even though, as mentioned in her original article, there are several ways to analyze publications with numerous proposed classification systems [2-4].

In the original model presented, there were 4 main practices identified, resulting from the interface of music and medicine: *Treatment of Musicians, Music in Medical and Health Education, Music Practices for Medical Patients and Staff,* and *Foundational Research*, each of which had their own

categories within, or sub categories. The criteria originally considered diverted categories in the following way: (1) the person or the group involved in conducting the practice; (2) the intent of the practice; (3) the recipients; (4) the need of the recipients; (5) the medium (medicine and/or music); (6) the setting; and (7) the intended outcome. [1]

As happened in the content analysis of the first 4 years of *Music and Medicine* [1], there were many overlaps between categories, and yet, as the articles were being categorized,

A need for creating new categories emerged, resulting in a total of 2 new proposed categories. These were added in an effort to be inclusive and represent the depth of all of the articles published in this journal from 2009 to 2018. The new categories and reinstallation of the latter are later described in detail. The first proposed new category is: *Other Music and Medicine Related*, which has 6 sub categories: *country overview, conferences, medical variables, development of music therapy in a new context,* and *book reviews.*

The second proposed new category is called *Reflections*, which is representative of a type of article that started publication for the first time in 2014 [5] and has continued until this day. *Reflections* are comprised considerations related to aspects of the human side of the people working within the field of music and medicine. Articles in this area focus on the following themes: *memorials* for people that have had a great influence on our profession; *personal reflections; commentary; reflections* on our work; and *parallels* between the work or therapeutic experience and music or musical pieces.

Finally, in an effort to gain comprehension of where the research is tending to focus, a brand new and complete analysis of all the keywords of the total 323 articles has been undertaken. This should provide us not only with an understanding of the categories that are being currently developed, but also with a deepened understanding of the nuances on how and what is each category is seeking to focus on.

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Erik Baumann, E-mail: erikbaumannc@gmail.com | COI statement: The author declared that no financial support was given for the writing of this article. The author has no conflict of interest to declare.

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International Association for Music & Medicine (IAMM).

Overview

In 10 years of publications, there have been a total of 36 Issues, with 4 Issues per year, except for the years 2009, the first year, where the journal commenced at mid-year, and in 2014, when the publication format shifted to an online green Journal format. Within the decade 7 journals have been Special Issues, devoted to particular topics. There have been a total of 43 editorial articles, inclusive of guest editorials, making the total sum of 323 articles through the 10-year period. This kind of articles have not been taken into consideration for the categories, since they only reflect on the contents of the articles published within the same issue, but have been considered as a keyword cluster on the keyword analysis.

The articles are distributed among 14 different sections in *Music and Medicine* (figure 1), in which we can notice that most of the articles published belong to the category of *Full length article* (n=242), followed by *Editorial* (n=43); *Book review* (n=10) and *Brief reports* (n=6).

Figure 1: Sections distribution

Section	
Editorial	43
Full length article	242
Introduction	1
Production editor note	2
Comments	3
Brief reports	6
Letters to the editors	1
Book Review	10
Clinical reports	3
Systematic reviews & meta analysis	2
Review	1
Conference	2
Country feature	2
Reflection	5
Total	323

Category analysis

Treatment of Musician’s Problems

This category is focused on the medical and psychological issues of musicians and most particularly those that affect their performance [1]. Not all of these conditions are the result of playing an instrument, but can also be related to preexisting conditions, lifestyle issues, or causes unrelated to playing, but necessarily affect the musician’s performance. [1]

The main goal of the treatment is to restore the musician’s performance capabilities to the fullest extent possible, as much as it is to prevent further problems or injuries. The treatment is usually under the charge of physicians, though other health professionals are involved, such as physical and occupational therapists, or psychologists, among others. [1]

In the case of the articles published in *Music and Medicine* within this category, sub category 1 has been provided to articles where the main treatment has been provided by a physician; sub category 2 for treatment involving mostly a music therapist; and 3 for interdisciplinary articles in which both of the last two sub categories combine.

All articles that fall under this category, and their corresponding sub category can be found in Table 1.

Table 1. Treatment of Musicians

Year	Vol	Nr	Article	Author/s	sub cat
2010	2	2	Shoulder Pain in Musicians	Kristen Thomas, Peter D. McCann	1
2010	2	2	Singer’s Dysphonia: Etiology, Treatment, and Team Management	Michael J. Pitman	1
2010	2	2	The Human Voice: Evolution and Performance	Michael S. Benninger	1
2010	2	2	The Performance Wellness Seminar: An Integrative Music Therapy Approach to Preventing Performance-Related Disorders in College-Age Musicians	Louise Montello	2
2010	2	2	An Integrative Bio-Psycho-Musical Assessment Model for the Treatment of Musicians: Part I—A Continuum of Support	Stephan Quentzel, Joanne V. Loewy	3
2010	2	2	An Integrative Bio-Psycho-Musical Assessment Model for the Treatment of Musicians: Part II—Intake and Assessment	Stephan Quentzel, Joanne V. Loewy	3
2010	2	4	Increased Exhaled Nitric Oxide in Wind and Brass Musicians	Anita Fuhrmann, Graham Hall, Peter Franklin	1
2012	4	3	Temporomandibular Disorders: Symptoms and Facial Pain in Orchestra Musicians in Finland	Jaana Heikkilä, Leena Hamberg, Jukka H. Meurman	1
2018	10	1	Bodywork: Tuning the Instrument of the Soul	Karina Gordin	1

Most of the articles published in this category are published by physicians or teams lead by physicians [7-12]; one is a program designed by a music therapist which aims at prevention of performance related disorders in students [13]; and there are two articles in which physicians and music

therapists are working together in the care of musician’s [14,15].

Music in Medical Education and Health Education

This is a large category, which involves the use of music to focus, to convey information in an accessible manner, to facilitate the recall of information, and/or to enhance the personal and professional skills of medical students and professionals [1]. At the time of Dileo’s summary analysis of 4 years of publications in *Music and Medicine*, only one article was found within this category [16], focusing mainly on the sub category (6) *Music as a Means of Health Education*. Originally, this category included 3 other sub categories: *Medical Humanities*, *Music to Enhance Acquisition of Medical Knowledge*, and *Music History and Medicine*. [1] Neither at the 4th anniversary of *Music and Medicine* or currently have any other articles been found in these 3 sub categories. Articles corresponding to this category can be found on Table 2.

Table 2. Music in Medical Education and Health Education

Year	Vol	Nr	Article	Author/s
2012	4	2	Focus Group Evaluation of the LIVE Network—An Audio Music Program to Promote ART Adherence Self-Management	Marcia McDonnell Holstad, Maya Baumann, Ighovwerha Ofotokun, Steven J. Logwood

Music Practices for Medical Patients and Staff

This category is focused on practices on the medical setting, and its sub categories are divided according to the person providing the music and the intent of the practice.[1] Originally there were only 3 sub categories: *Music Practices by Musicians*; *Music Practices by Medical Staff*; and *Music Practices by Music Therapists*. [1] A fourth sub category has now been added, due to the increasing amount of interdisciplinary teams’ articles, generating a new sub category entitled: *Music Practices by Interdisciplinary Teams*.

Music Practices by Musicians

Both professional and amateur musicians working through performances and concerts in hospitals or healthcare facilities, or any other context such as distinct hospital units, waiting rooms, and bedside for small or large groups, and either for patients and/or staff are considered within this sub category. [1] Dileo formerly divided this practice in two: *Environmental Music Practices* and *Diversional Music Practices* [1]. Since the total number of articles within this sub category was only 4, this sub division has not been considered.

The intention of this type of practice can vary greatly from one intervention to the next, including many other variables such as the training of the musician or the need and

type of individuals receiving the music. [1] This type of intervention has an impact on the environment, with a capacity to transform it into a less threatening, less stressful, less impersonal, more ‘human’ space [1]. Its effects can also vary greatly, from relaxation, to pain relief, from normalization to community-building, among other topics. [1]. On the other hand, integration (formerly defined as ‘diversional’) practices and the benefits of music performances in health care settings is also being researched [1]. All articles published corresponding to *Music Practices by Musicians* can be found on Table 3.

Table 3. Music Practices by Musicians

Year	Vol	Nr	Article	Author/s
2009	1	1	The Effect of Music on the Cognition of Older Adults Undergoing Hip and Knee Surgery	Ruth G. McCaffrey
2010	2	1	Locomotion-Encoded Musical Movements (LEMMS): A Proposed Use for Four Categories of Vertebrate Locomotion in Music Medicine Application and Research	Andrew Warshaw
2010	2	4	Delivering a Music Intervention in a Randomized Controlled Trial Involving Older People With Dementia: Musician Experiences and Reflections	Scott Harrison, Marie Cooke, Wendy Moyle, David Shum, Jenny Murfield
2012	4	3	Impact of an Interdisciplinary Concert Series on Stress and Work–Life Balance in a Dental College	Charles D. Larsen, Midori Larsen, Michael D. Larsen, Cerish Im, Amr M. Moursi, Marilyn Nonken

There haven’t been any identified articles in this sub category published in *Music and Medicine* since 2012.

Music Practices by Medical Staff

These practices were formerly split into 3 sub categories: *Music Medicine*, *Music Performance for Patients*, and *Personal Use During Medical Procedures*. [1] This sub category is often known as *music medicine* or *music in medicine*, refers to the use of music by medical personnel. [1] In *Music and Medicine* this type of article is often present, reflecting on how varied end extensive this type of practice is and perhaps that this journal has provided a forum for the growth of such practices, which was one of the aims of the journal’s original intentions [17]. Articles published treat a vast array of topics, from cardiac postoperative surgery [18], or dementia [19,20], to anxiety, stress and pain management [21,22], among others. There is also a large variety of populations with whom this type of practice is developing, varying from premature infants [21] to patients with schizophrenia [23], and even culture-specific interventions [23,24]. All articles published within this category can be found on Table 4.

Table 4. *Music Practices by Medical Staff*

Year	Vol	Nr	Article	Author/s
2009	1	1	A Pilot Study of Patients in Postoperative Cardiac Surgery	Fred J. Schwartz
2009	1	2	Coexistent Acquired Hearing Loss and Right Fronto-Parietal Meningioma as Causes of Musical Hallucinations	Tamás Tényi, Péter Móricz, János Stefanits, Péter Barsi, József Janszky
2010	2	3	A Cognitive-Attentional Perspective on the Psychological Benefits of Listening	Rodger Graham
2011	3	2	Effects of Music on Physiological and Behavioral Indices of Acute Pain and Stress in Premature Infants: Clinical Trial and Literature Review	Mark Jude Tramo, Miriam Lense, Caitlin Van Ness, Jerome Kagan, Margaret Doyle Settle, Jonathan H. Cronin
2012	4	4	Humming as a Potential Tool for Facilitating Feeding Situations Between Persons With Dementia and Their Caregiver: A Single Case Study	Gabriella Engström, Lena Marmstål Hammar
2012	4	4	Can Caregiver Singing Improve Person Transfer Situations in Dementia Care?	Eva Götell, Charlotta Thunborg, Anne Söderlund, Petra Heideken Wåger
2013	5	1	The Effects of Musical Activity on the Self-Esteem and Self-Efficacy of Patients With Schizophrenia: A Cultural Study in West Bengal, India	Stephanie Hovey
2013	5	2	The Potential Effects of the Didgeridoo as an Indigenous Intervention for Australian Aborigines: A Post Analysis	Robert Eley
2013	5	2	Mozart Piano Sonatas as a Nonpharmacological Adjunct to Facilitate Sedation Vacation in Critically Ill Patients	William T.H. To, Tianna Bertolo, Victor Dinh, Draga Jichici, Cindy M. Hamielec
2014	6	1	Exploring Therapeutic Songwriting for Filipino Children with Leukemia	Marisa V. Marin
2017	9	2	Bridging Music and Military Mental Health: A Pilot Study Examining Music Interventions in the Military Outpatient Mental Health Waiting Room Environment	Thomas Michael Christian, Ayesha Edwards, Amanda Stickler, Eric Henderson, Rachel Markwald, Marlo Narro, Lisa Hess, Jeffrey Millegan
2018	10	4	The Effects of Music Intervention on Women's Anxiety Before and After Cesarean Delivery: A Randomized Controlled Trial	Jeff M Denney, Karen L. Blackburn, Courtney C. Bleach, Anibal R. Martinez, Jennifer Bromley Philips, Kristi Lanier, Laura Dean, Heather Mertz

The publications within this practice reflect not only on the amplitude of this sub category, but also on the relevance of the research within, having articles published within this sect almost every single year, with the exception of 2016.

Music Practices by Music Therapists

This sub category refers specifically to music therapy interventions within the medical context and performed by trained music therapists.[1] The articles published in *Music and Medicine* throughout the years reflect on the many different settings where music therapists work within medical contexts (Table 5). These also reflect upon the importance of research within this category of articles, having a large amount of publications that result form investigatory circumstances.

Dileo identified a wide range of medical conditions in which music therapists describe their work through publications in *Music and Medicine*, such as *neonatal intensive care, oncology, hospice, rehabilitation, psychiatry, pediatrics, critical care, cardiology, pain, bereavement*, as well as practice area specialty articles on *vibroacustics* and *assessment* [1]. Since the 2014 publication, articles focusing under these topic conditions have continued to be published, as new articles appearing with other distinct types of interventions have emerged, such as *Guided Imagery in Music (GIM)* [25], or *melodic intonation therapy* [26]. A total of 41 articles within this sub category have been identified (Table 5).

Table 5. Music Practices by Music Therapists

Year	Vol	Nr	Article	Author/s
2009	1	1	PATTERNS—A Model for Evaluating Trauma in NICU Music Therapy: Part 1—Theory and Design	Kristen Stewart
2009	1	1	Objectivist and Constructivist Music Therapy Research in Oncology and Palliative Care: An Overview and Reflection	Clare O’Callaghan
2009	1	2	SIPARI: A Music Therapy Intervention for Patients Suffering With Chronic, Nonfluent Aphasia	Monika Jungblut
2009	1	2	Integrating Musical and Psychological Thinking: The Relationship Between Music and Words in Clinically Improvised Songs	Alan Turry
2009	1	2	PATTERNS—A Model for Evaluating Trauma in NICU Music Therapy: Part 2—Treatment Parameters	Kristen Stewart
2010	2	2	Neurologic Music Therapy: A Scientific Paradigm for Clinical Practice	Shannon K. de l’Etoile
2010	2	2	Recovery of Fluent Speech Through a Musician’s Use of Prelearned Song Repertoire: A Case Study	Concetta M. Tomaino
2010	2	3	The Effects of Music Entrainment on Postoperative Pain Perception in Pediatric Patients	Joke Bradt
2010	2	3	Music Therapy in the PICU: 0- to 6-Month-Old Babies	María Jesús del Olmo, Cintia Rodríguez Garrido, Francisco Ruza Tarrío
2010	2	3	The Effect of Music and Imagery to Induce Relaxation and Reduce Nausea and Emesis in Patients With Cancer Undergoing Chemotherapy Treatment	María Montserrat Gimeno
2010	2	4	The Effect of Music and Audiobook Listening on People Recovering From Stroke: The Patient’s Point of View	Anita Forsblom, Teppo Särkämö, Sari Laitinen, Mari Tervaniemi
2011	3	1	Supportive Cancer Care at the End of Life: Mapping the Cultural Landscape in Palliative Care and Music Therapy	Lucy Forrest
2011	3	1	All in Good Time: A Music Therapist’s Reflection of Providing a Music Therapy Program in a Pediatric Cancer Center Over 20 Years	Beth Dun
2011	3	1	Facing the Dread and Desolation of Cancer Through Music Therapy: A Client’s Perspective	Maria Logis
2011	3	1	Portraits of Music Therapy in Facilitating Relationship Completion at the End of Life	Amy Clements-Cortes
2011	3	1	Bereaved Family Caregivers’ Reflections on the Role of the Music Therapist	Lucanne Magill
2011	3	2	Stabilization Music Therapy Model and Process: 512 China Sichuan Earthquake Crisis Interventions, Part 1 of 2	Jennifer Hsiao-Ying Tiao Shih
2011	3	2	Stabilization Music Therapy Model and Process: 512 China Sichuan Earthquake Crisis Interventions, Part 2 of 2	Jennifer Hsiao-Ying Tiao Shih
2011	3	4	Music in a Hospital: The Impact of a Live Music Program on Pediatric Patients and Their Caregivers	Constanza Preti, Graham F. Welch
2011	3	4	Instituting a Music Listening Intervention for Critically Ill Patients Receiving Mechanical Ventilation: Exemplars From Two Patient Cases	Annie Heiderscheit, Linda Chlan, Kim Donley
2012	4	3	Contemporary Vibroacoustic Therapy: Perspectives on Clinical Practice, Research, and Training	Marko Punkanen, Esa Ala-Ruona
2012	4	3	Singing Therapy for Young People With Cystic Fibrosis: A Randomized Controlled Pilot Study	J. Yoon Irons, Dianna T. Kenny, Margaret McElrea, Anne B. Chang
2012	4	3	Music Therapy for the Pediatric Patient Experiencing Agitation During Posttraumatic Amnesia: Constructing a Foundation From Theory	Janeen Bower, Helen Shoemark
2012	4	3	A Polyphony of Dimensions: Music, Pain, and Aesthetic Perception	Susanne Metzner
2013	5	2	An Introduction to MER, a New Music Psychotherapy Approach for PTSD: Part 1—The Theoretical and Clinical Foundations	Tian Gao
2013	5	2	An Introduction to MER, a New Music Psychotherapy Approach for PTSD: Part 2—The Outcomes and Case Examples	Tian Gao
2013	5	3	A Comparison of the Effects of Music Therapy Interventions on Depression, Anxiety, Anger, and Stress on Alcohol-Dependent Clients: A Pilot Study	Eun-Young Hwang, Sun-Hwa Oh
2015	7	3	The Development of a Music Therapy Protocol: A Music 4 Life® Case Report of a Veteran with PTSD	Rebecca Wellman, Judith Pinkerton
2015	7	4	Singing for Health, Connection and Care	Amy Clements-Cortés
2016	8	1	The Use of a Music Therapy Choir to Reduce Depression and Improve Quality of Life in Older Adults – A Randomized Control Trial	Bill Ahessy
2016	8	1	The Military, Moral Injury, and Music Therapy	Torrey Gimpel
2016	8	2	Healing from the Core: Music and Imagery in the Cancer Journey	Dawn McDougal Miller

2016	8	2	At the Crossroads of Midlife: Journeying the Midlife Transition with Guided Imagery and Music	Louise Terry-Clark
2016	8	3	Mars Rising: Music Therapy and the Increasing Presence of Fathers in the NICU	John F. Mondanaro, Mark Ettenberger, Laurie Park
2017	9	1	Music therapy for infants with neonatal abstinence syndrome	Jacinta Louise Calabro
2017	9	1	Music Therapy and Mindfulness: Treating Women with Addiction in a Therapeutic Community	Stephanie Miller
2018	10	1	Perinatal Music Therapy: Using Doppler Recordings to Connect and Create	Brian Schreck, Alexa Economos
2018	10	2	Relationship Completion in Palliative Care Music Therapy: Clinical Case Example-Part 1	Amy Clements-Cortes
2018	10	2	Relationship Completion in Palliative Care Music Therapy: Clinical Case Research Overview and Results-Part 2	Amy Clements-Cortes
2018	10	2	Modified Melodic Intonation Therapy for Acquired Non-Fluent Aphasia	Dwyer B Conklyn, Taylor A Rung Meehan
2018	10	3	All Roads Lead To Where I Stand: A Veteran Case Review	Kristen Stewart

Music Practices by Interdisciplinary Teams

This new sub category was created by the appearance of several articles in which both physicians and music therapists, or music therapists and other healthcare professionals, have worked as part of an interdisciplinary team. A total of 28 articles have been found in this sub category. The areas of work by interdisciplinary teams are as vast and varied as in the

previous two sub categories, where a growing number of populations and/or situational occurrence articles published in *Music and Medicine* begged action of an interdisciplinary team-in areas such as: *aphasia* [27,28], *noise stress* [29], *palliative care* [30-32], or *neonatology* [33-35], among others. Articles published by interdisciplinary teams can be found in Table 6.

Table 6. *Music Practices by Interdisciplinary Teams*

Year	Vol	Nr	Article	Author/s
2009	1	1	Long-Term Recovery From Chronic Global Aphasia: A Case Report	Monika Jungblut, Matthias Suchanek, Horst Gerhard
2010	2	1	The Role of Live Music and Singing as a Stress-Reducing Modality in the Neonatal Intensive Care Unit Environment	Eliana Gilad, Shmuel Arnon
2010	2	1	“Some Light at the End of the Tunnel”: Exploring Users’ Evidence for the Effectiveness of Music Therapy in Adult Mental Health Settings	Gary Ansdell, John Meehan
2010	2	1	Psychometric Results of the Music Therapy Scale (MAKS) for Measuring Expression and Communication	Dorothee von Moreau, Heiner Ellgring, Kirstin Goth, Fritz Poustka, David Aldridge
2010	2	1	“Stop Cutting—Rock!”: A Pilot Study of a Music Therapeutic Program for Self-Injuring Adolescents	Paul L. Plener, Thorsten Sukale, Andrea G. Ludolph, Thomas Stegemann
2010	2	4	Using Music to Reduce Noise Stress for Patients in the Emergency Department: A Pilot Study	Alison E. Short, Nicole Ahern, Anna Holdgate, Jenny Morris, Balwinder Sidhu
2010	2	4	Music Therapy in Perinatal Psychiatry: Use of Lullabies for Pregnant and Postpartum Women with Mental Illness	Susan Hatters Friedman, Ronna S. Kaplan, Miriam B. Rosenthal, Patty Console
2010	2	4	The Role of Music and Music Therapy in Aphasia Rehabilitation	Meghan L. Hartley, Alan Turry, Preeti Raghavan
2011	3	1	Music Therapy and the Symphony: A University-Community Collaborative Project in Palliative Care	Sandra L. Curtis
2011	3	1	A Pilot Music Therapy-Centered Grief Intervention for Nurses and Ancillary Staff Working in Cancer Settings	Karen Popkin, Tomer Levin, Wendy G. Lichtenthal, Nina Redl, Harry D. Rothstein, Donna Siegel, Nessa Coyle
2011	3	1	Music Among Family Carers of People With Life-Threatening Cancer	Clare C. O’Callaghan, Peter Hudson, Fiona McDermott, John R. Zalberg
2012	4	1	The Benefit of Music for the Reduction of Stress and Anxiety in Patients Undergoing Elective Cosmetic Surgery	Joanna DeMarco, Jeffrey L. Alexander, Guy Nehrenz, Lisa Gallagher
2012	4	1	A Feasibility Study of the Effects of Music and Movement on Physical Function, Quality of Life, Depression, and Anxiety in Patients With Parkinson Disease	Alicia Ann Clair, Kelly E. Lyons, Janet Hamburg

2012	4	2	Evaluating a Treatment Manual for Music Therapy in Adult Outpatient Oncology Care	Alexander F. Wormit, Marco Warth, Julian Koenig, Thomas K. Hillecke, Hubert J. Bardenheuer
2012	4	4	Environmental Music Therapy: A Pilot Study on the Effects of Music Therapy in a Chemotherapy Infusion Suite	Bernardo Canga, Cho Long Hahm, David Lucido, Michael L. Grossbard, Joanne V. Loewy
2013	5	3	Therapeutic Singing as an Adjunct for Pulmonary Rehabilitation Participants With COPD: Outcomes of a Feasibility Study	Donna Goodridge, Jennifer J. Nicol, Karla J. Horvey, Scotty Butcher
2013	5	3	Effects of Music Intervention on Patients Undergoing Hemodialysis in the Bangkok Metropolitan Administration Hospitals	Bussakorn Binson, Somrat Lertmaharit, Pranee Satayaprapkop, Kamonrat Chongthanakorn, Chanchana Boonyakrai, Samran Klinphaetkit, Navaphan Nakkaban, Patravoot Dinpragpada, Charuwan Boonpob
2014	6	1	Music Speaks the Words: An Integrated Program for Rehabilitation of Post Laryngectomy Patients in Khon Kaen, Thailand	Patravoot Vatanasapt, Nuchanart Vatanasapt, Supawan Laohasiriwong, Benjamas Prathanee
2015	7	1	Effectiveness of Music Therapy in Advanced Cancer Patients Admitted to a Palliative Care Unit: A Non-Randomized Controlled, Clinical Trial	José Planas Domingo, Núria Escudé Matamoros, Cristina Farriols Danés, Helena Villar Abelló, Jordi Mercadé Carranza, Ada I Ruiz Ripoll, Sergi Mojal Garcia, Andrew Rossetti
2015	7	2	The Effects of Functionally Oriented Music Therapy on Body Function and Quality of Life in Chronic Stroke Survivors and on Patients with Parkinson’s Disease	Åsa Rosin, Margareta Ericsson, Karina Larsson
2015	7	2	The Effects of a Music Therapy Intervention in PICU as Measured by the Comfort Behavior Scale	María Jesús del Olmo, Francisco Ruza Tarrío, Cintia Rodríguez Garrido, Pilar Carrasco Marina
2016	8	3	Feasibility Study of a Music Therapy Intervention for Patients Breast Cancer Survivors with Cognitive Dysfunction: The MusIC Study	Kathy J Helzlsouer, Kelly Phair, Shannon Manocheh, Stephen Holmes
2017	9	2	Efficacy of Live Lullaby Singing During Procedural Pain in Preterm and Term Neonates.	Alexandra Ullsten, Pernilla Hugoson, Malin Forsberg, Lisa Forzelius, Maria Klässbo, Emma Olsson, Ulrik Volgstén, Björn Westrup, Ulrika Ådén, Lena Bergqvist, Mats Eriksson
2017	9	2	Exploring the feasibility of a music-assisted relaxation intervention to assist with the initiation of non-invasive ventilation in people with Motor Neuron Disease	Jeanette Tamplin, Felicity A Baker, Rebecca Davies, Eleanor Bajo, Karen Bolger, Nicole Sheers, David Berlowitz
2017	9	4	Comfort, Connection and Music: Experiences of Music Therapy and Inter-Active Listening on a Palliative Care Unit	SarahRose Black, Gary Rodin, Camilla Zimmermann
2017	9	4	Development of a music therapy programme for healthy elderly in the community – A pilot evaluation on feasibility and acceptability	Mabel Qi He Leow, Michelle Yin Yin Low, Carol Tien Tau Loi, Patsy Lee Peng Tan, Shian Chao Tay
2018	10	2	Clinical observations of live improvisational harp music in neonatal intensive care	Roxanne McLeod, Kaye Spence
2018	10	3	Weaving Words and Music: Healing from Trauma for People with Serious Mental Illness	Gillian Stephens Langdon, Faye Margolis, Kristina Muenzenmaier

Foundational Research

Among a varied amount of information that can be found within this category, research literature here provides the foundation for many of the practices that emerge from the distinct interface of music and medicine. [1] This is also one of the categories with the most number of articles published, with a total of 140 articles. One of the main characteristics of this category is the “laboratory”, rather than the pursuance of simply clinically focused topics. [1] Originally considered as examples of foundational research were: *music neuroscience; physiological responses to music; psychological responses to music; and musical characteristics of special populations.* [1] In the current article, these examples have been considered as sub categories, adding a 5th sub category: *development of music therapy in general.*

One element to be noticed within this classification is that overlapping sub categories are quite common. The criteria

chosen to assign an article to one sub category or another has been by order of appearance. This means, that if an article researched both physiological and psychological responses to music, the order in which those are mentioned within the title will determine in which sub category it belongs to. This is done so that a common criteria can be established when an article belongs to more than one category or sub category, and makes allowances for any overlapping within this structural/categorization effort.

Music neuroscience

6 articles were found in this subcategory. Music neuroscience articles have largely been published by varied teams of researchers, and in its majority, interdisciplinary. [36-38]. As it might be expected, neuroscientists are usually involved in these type of articles, [36,38,39]. (Table 7)

Table 7: Music neuroscience

Year	Vol	Nr	Article	Author/s
2009	1	1	The Neural Correlates of Temporal Structure in Music	Daniel J. Levitin
2012	4	2	Getting to the Heart: Autonomic Nervous System Function in the Context of Evidence-Based Music Therapy	Robert J. Ellis, Julian F. Koenig,
2013	5	4	Neurobiological Aspects of Neurologic Music Therapy	Thayer Eckart, Altmüller, Gottfried Schlaug
2013	5	4	Neurophysiological Correlates of Musical Giftedness in Autism Spectrum Disorders	Marianna Boso, Egidio D'Angelo, Francesco Barale
2013	5	4	The Neurobiological Foundation of Neurologic Music Therapy	A. Blythe LaGasse, Michael H. Thaut
2015	7	1	The Effectiveness of a Music Therapy Protocol for a Person with Nonfluent Aphasia: A Preliminary Case Report	Anita L. Gadberry, Vijayachandra Ramachandra

Physiological responses to music

Physiological responses to music continue to be one of the most researched areas of music and medicine, with a total of 21 articles published. Once again, many articles that could be assigned to this sub category have been placed in overlapping categories, for which the exact number of articles that measure physiological responses to music could be higher if multiple sub categories were being considered for each article. Here we can find a large variety of articles, out of which *heart rate variability* appears to be one of the most considered variables [40-45]. There is a large variety of populations in which this kind of research is performed, such as elders [46,47], or oncological patients [43]. There is an interest also in specific activities such as singing [40,42,48], or musical training [47]. Articles within this sub category can be found in Table 8.

Table 8. Physiological responses to music

Year	Vol	Nr	Article	Author/s
2010	2	1	Heart Rate Variability During Singing and Flute Playing	Lázló Harmat, Töres Theorell
2010	2	3	Music Hath Charms: The Effects of Valence and Arousal on Recovery Following an Acute Stressor	Gillian M. Sandstorm, Frank A. Russo
2011	3	2	Bodily Movements Influence Heart Rate Variability (HRV) Responses to Isolated Melodic Intervals	Göran Kranz, Gunter Kreutz, Mats Ericson, Töres Theorell
2011	3	4	Music and Auditory Distraction Reduce Pain: Emotional or Attentional Effects?	Nicolas Silvestrini, Valérie Piguet, Christine Cedraschi, Marcel R. Zentner
2012	4	1	Effects of Widespread and Frequent Personalized Music Programming on Agitation and Depression in Assisted Living Facility Residents With Alzheimer-Type Dementia	Petr Janata
2012	4	1	Effect of Musical Training on Reaction Time: A Randomized Control Trial in Thai Elderly Individuals	Supalak Khemthong, Udom Pejarasangharn, Trirat Uptampohtiwat, Ariya Khamya
2012	4	2	Musical Piloerection	Björn Vickhoff, Rickard Åström, Töres Theorell, Bo von Schéele, Michael Nilsson
2012	4	2	The Effect of Music on Human Physiology and Pathophysiology	Hans-Joachim Trappe
2013	5	1	Heart Rate Variability During Choral Singing	Erik M.G. Olsson, Bo von Schéele, Töres Theorell
2013	5	2	Impact of Hindustani Ragas on Visual Acuity, Spatial Orientation, and Cognitive Functions in Patients With Cerebrovascular Accident and Diffuse Head Injury	Shashi Bhushan Singh, Soubhik Chakraborty, Keashav Mohan Jha, Satish Chandra, Shanti Prakash
2013	5	3	Heart Rate Variability During Monochord- Induced Relaxation in Female Patients With Cancer Undergoing Chemotherapy	Eun-Jeong Lee, Joydeep Bhattacharya
2015	7	1	The Dark Side of the Moon: Music may reduce pain but white noise may increase it!	Ravi R Bhatt, DeWayne P. Williams, Michael Kessler, Thomas K. Hillecke, Julian F. Thayer, Julian Koenig
2015	7	4	The Effect of Indian Classical Music on Migraine Episodes in Young Females of Age Group 18 to 23 Years	Tanvi Jha, Anita Pawar, Keashav Mohan Jah, Madhulika Monga, Sunita Mondai, Asha Gandhi
2015	7	4	The Role of Music in Improving Exercise Capacity in Patients with Acute Exacerbation of Chronic Obstructive Pulmonary Disease as Measured by the 2-minute Walking Test	Anuk Kruavit, Eugene Teh, Imogen Clark, Vikas Vadhwa

2015	7	4	Changes in Spirometry, Quality of Life and Well-Being in Persons with Asthma following Singing, Diaphragmatic Breathing, and Singing and Diaphragmatic Breathing: A Pilot Study	Mary L. Gick, Carina Daugherty
2016	8	1	Effects of Different Styles of Music on Human Cardiovascular Response: A Prospective Controlled Trial	Hans-Joachim Trappe, Irimi Maria Brecker
2016	8	1	Gender Differences in Psychophysiological Responses to Music Listening	Uma Gupta, B. S. Gupta
2016	8	4	An Experimental Field Study of the Effects of Listening to Self-selected Music on Emotions, Stress, and Cortisol Levels	Marie Helsing, Daniel Västfjäll, Pär Bjälkebring, Patrik Juslin, Terry Hartig
2017	9	1	Special Edition: The effects of the Bonny Method of Guided Imagery and Music (GIM) on interpersonal problems, sense of coherence, and salivary Immunoglobulin A of adults in chemical dependency treatment	Annie Heiderscheit
2018	10	1	Differential effects of Bach's Orchestral Suite No. 3 on blood pressure and heart rate - a prospective controlled study	Hans-Joachim Trappe, Irimi Maria Breker
2018	10	2	Relaxation Effects of Musically Guided Resonance Breathing: A Randomized Controlled Pilot Study	Dominik Fuchs, Thomas K Hillecke, Marco Warth
2018	10	4	Evaluation of the effect of Indian classical music on the blood sugar level of Type-2 Diabetes Mellitus patients.	Anjana Muralidharan Pillai, Dr. Darshan Jitendra Dave
2018	10	4	Low Frequency Music Slows Heart Rate and Decreases Sympathetic Activity	James D. Halbert, Debra R. van Tuyl, Carl Purdy, Guang Hao, Steven Cauthron, Christine Crookall, Baban Babak, Richard Topolski, Ayman Al-Hendy, Gaston K. Kapuku

Psychological responses to music

Psychological responses to music is another one of the categories that has been in the interest of researchers since the first volume of *Music and Medicine*, and one that continues to gather their attention. There have been 10 articles published regarding the psychological responses to music. As with the previous sub category, this number is higher if we take into consideration that these categories often overlap. Research published in this journal reflects the interest for

understanding the effect of music on specific emotions such as *depression* [49,50] or *anxiety* [50]. In most cases found in *Music and Medicine*, the aim of this kind of research is to understand what kind of psychological responses subjects have to music under varying circumstances, such as dancing to Argentinean tango [51]; or specific music therapy interventions such as depth relaxation music therapy [52] or Guided Imagery and Music [53]

Table 9. *Psychological responses to music*

Year	Vol	Nr	Article	Author/s
2009	1	1	Emotional and Neurohumoral Responses to Dancing Tango Argentino: The Effects of Music and Partner	Cynthia Quiroga, Stephan Bongard, Gunter Kreutz
2010	2	3	Controlled Induction of Negative and Positive Emotions by Means of Group Singing	Frank Wendrich, Gernot Brauchle, Roland Staudinger
2011	3	4	Musically Induced Emotions: Subjective Measures of Arousal and Valence	Barbara Wheeler, Estate Sokhadze, Joshua Baruth, Gene Ann Behrens, Carla F. Quinn
2012	4	1	Effects of Melodic Complexity and Rhythm on Working Memory as Measured by Digit Recall Performance	Michael J. Silverman
2013	5	2	On a Blue Note: Depressed Peoples' Reasons for Listening to Music	Kay Wilhelm, Inika Gillis, Emery Schubert, Erin Louise Whittle
2016	8	1	Gender Differences in Psychophysiological Responses to Music Listening	Uma Gupta, B. S. Gupta
2016	8	3	Expression of Emotions in Carnatic Vocal Music	Nandhu Radhakrishnan, Savithri S.R., Rammohan Gangiset
2016	8	4	Changes in States of Consciousness during a Period of Silence after a Session of Depth Relaxation Music Therapy (DRMT)	Eric Pfeifer, Anna Sarikaya, Marc Wittmann
2017	9	1	Special Edition: The effects of the Bonny Method of Guided Imagery and Music (GIM) on interpersonal problems, sense of coherence, and salivary Immunoglobulin A of adults in chemical dependency treatment	Annie Heiderscheit
2018	10	2	Does regular listening to preferred music have a beneficial effect on symptoms of depression and anxiety amongst older people in residential care? The qualitative findings of a mixed methods study.	Fiona Costa, Adam Ockelford, David J Hargreaves

Musical characteristics of special populations

The need for comprehension of how music or music therapy interventions affect a specific population is reflected in this sub category, with a total of 47 articles published. As in other sub categories, this number doesn't consider overlapping categories, which would only increase this number. The most common population mentioned in articles published in *Music and Medicine* were children, specifically presenting with unique needs, such as: Down syndrome [54], complex needs [55], autism spectrum disorder [56] or exposed prenatally to

cocaine [57], just to mention a few examples. Populations undergoing specific types of treatment such as cancer treatment [58]; or specific music-based treatments such as vibroacoustics [59-61] or Rhythmic Sensory Stimulation [62] in different settings are a predominant theme within this sub category. Other topics worth mentioning due to the amount of publications in this journal (but not based on its relevance) are: brain injury [63], Alzheimer's disease [62,64] and rehabilitation [65,66] among others.

Table 10. *Musical characteristics of special populations*

Year	Vol	Nr	Article	Author/s
2010	2	4	Evaluation of The Listening Program in Assessing Auditory Processing and Speech Skills in Children With Down Syndrome	Gwyneth Jeyes, Caroline Newton
2011	3	2	Biased Emotional Preferences in Depression: Decreased Liking of Angry and Energetic Music by Depressed Patients	Marko Punkanen, Tuomas Eerola, Jaakko Erkkilä
2011	3	3	Brain-Computer Music Interfacing (BCMI): From Basic Research to the Real World of Special Needs	Eduardo R. Miranda, Wendy L. Magee, John J. Wilson, Joel Eaton, Ramaswamy Palaniappan
2011	3	3	Designing Musically Assisted Rehabilitation Systems	David W. Ramsey
2011	3	3	Using Music Technology in Music Therapy With Populations Across the Life Span in Medical and Educational Programs	Wendy L. Magee, Michael Bertolami, Lorrie Kubicek, Marcia LaJoie, Lisa Martino, Adam Sankowski, Jennifer Townsend, Annette M. Whitehead-Pleaux, Julie Buras Zigo
2011	3	3	Indications and Counterindications for Electronic Music Technologies in a Pediatric Medical Setting	Annette M. Whitehead-Pleaux, Stephanie L. Clark, Lisa E. Spall
2011	3	3	Engaging Industrial Designers With Music Therapy	Liz Norman, Eddie Norman
2011	3	3	A Musical Improvisation Interface for People With Severe Physical Disabilities	Pauline Oliveros, Leaf Miller, Jacklyn Heyen, Gillian Siddall, Sergio Hazard
2011	3	3	Dynamic Sonification as a Free Music Improvisation Tool for Physically Disabled Adults	Alan Lem, Garth Paine
2011	3	3	Sounds of Intent: Interactive Software to Assess the Musical Development of Children and Young People With Complex Needs	Angela Voglatzoglou, Adam Ockelford, Graham Welch, Evangelos Himonides
2011	3	3	Music Therapy Methods With Hand-Held Music Devices in Contemporary Clinical Practice: A Commentary	Joseph C. Nagler
2011	3	4	Containment and Communication Through Musical Preference	Trisha Ready
2011	3	4	Music Cognition in Breast Cancer Survivors	Debra Burns, Tonya R. Bergeson, Susan M. Perkins, Brenna C. McDonald, Andrew J. Saykin, Fred W. Unverzagt, Victoria L. Champion
2012	4	1	An Embodied Approach to Testing Musical Empathy in Participants With an Autism Spectrum Disorder	Leen De Bruyn, dirk Moelants, Marc Leman
2012	4	1	The Effect of Music on the Production of Neurotransmitters, Hormones, Cytokines, and Peptides: A Review	Abhishek Gangrade
2012	4	3	Music, Emotion, and Dementia: Insight From Neuroscientific and Clinical Research	Teppo Särkämö, Sari Laitinen, Mari Tervaniemi, Ava Nummien, Merja Kurki, Pekka Rantanen
2012	4	4	Using the MOGLASS in Group Music Therapy With Individuals With Muscular Dystrophy: A Pilot Study	Wang Feng Ng, Yinsheng Zhou, Patsy Tan, Ye Wang
2012	4	4	Research Strategies to Achieve a Deeper Understanding of Active Music Therapy in Neonatal Care	Frederike Barbara Haslbeck
2012	4	4	Academic Functioning of Slow Learners: A Therapeutic Music Intervention	Mamta Sharma
2013	5	1	Description of an Audio-Based Paced Respiration Intervention for Vasomotor Symptom	Debra S. Burns, Michael R. Drews, Janet S. Carpenter
2013	5	1	Intensive Tango Dance Program for People With Self-Referred Affective Symptoms	Rosa Pinniger, Einar B. Thorsteinsson, Rhonda F. Brown, Patricia McKinley

2013	5	1	Voice Movement Therapy: Evaluation of a Group-Based Expressive Arts Therapy for Nonsuicidal Self-Injury in Young Adults	Sophie Martin, Graham Martin, Belinda Lequertier, Sarah Swannell, Anna Follent, Florence Choe
2013	5	2	Music, Intelligence, and the Neurocognitive Effects of Childhood Cancer Treatment	Nathaniel Hiscock, Clare O'Callaghan, Megan Goodwin, Greg Wheeler
2013	5	3	Musical Instrument Modifications for Individuals With Neurodevelopmental Disabilities	Yuezhou Yu, Warren M. Shadd, Kelly A. Kleifges, Linda A. Myers, Phillip L. Pearl
2013	5	3	A Pilot Study on the Effects of Orff-Based Therapeutic Music in Children With Autism Spectrum Disorder	Ladan Dezfoolian, Mina Zarei, Hassan Ashayeri, Majid Yousefi Looyeh
2013	5	4	Electroencephalography and Music Therapy: On the Same Wavelength?	Jörg Fachner, Thomas Stagemann
2014	6	1	Cognitive Collaborations: Sounding Southeast Asian Sensibilities in Thai and Balinese Rituals	Made Mantle Hood, Bussakorn Binson
2014	6	1	The Body Becoming: Transformative Performance in Malaysian Mak Yong	Patricia A. Hardwick
2014	6	2	Music for Life Sustenance: Does Music have a Role in Intensive Care Medicine?	Jennifer N. Harris
2014	6	2	Music Preferences of Mechanically Ventilated Patients Participating in a Randomized Controlled Trial	Annie Heiderscheit, Stephanie J. Breckenridge, Linda L. Chlan, Kay Savik
2015	7	1	The Relationship Between Music, Exercise, Self-Reported Health, and Health Behaviours Among Cardiac Rehabilitation Patients	David A. Alter, Shanmugappiriya Sivarajah, Carolyn A. Freedman, Heidi Ahonen, Laurel Young, Susan Marzolini
2015	7	1	HIV Prevention and Hip Hop: What's the Spin?	Abbas Rattani, Raafay H. Syed, Jeremy Sugarman
2015	7	2	Chiari Malformation: A Potential Cause of Headaches in Brass Players	Ellis Cerrone, Thomas A. Carroll
2015	7	3	Preservation of Singing Functioning in a 5 Year-Old Following Severe Right-Sided Traumatic Brain Injury: Insights into the Neurological Resilience of Song from Pediatric Music Therapy	Ellen C. Gentle, Melinda Barker, Janeen Bowe
2015	7	3	The Effects of Mothers' Voice on the Long Term Development of Premature Infants: A Prospective Randomized Study	Monika Nöcker-Ribaupierre, Otwin Linderkamp, Klaus P. Riegel
2015	7	3	Perceptions of Patients and Families who Received a Music Intervention During Mechanical Ventilation	Mary F. Tracy, Abbey Staugaitis, Linda Chlan, Annie Heiderscheit
2015	7	4	Clinical Effects of Choral Singing for Older Adults	Amy Clements-Cortés
2016	8	2	Guided Imagery and Music and the Visually Impaired. Help me stay with the light!	Maria Samara
2017	9	1	Retraining of drug reward, music cues and state-dependent recall in music therapy	Jörg Fachner
2017	9	3	Feeling vibrations from a hearing and dual-sensory impaired perspective	Russ Palmer, Olav Skille, Riitta Lahtinen, Stina Ojala
2017	9	3	Vibroacoustic treatment for chronic pain and mood disorders in a specialized healthcare setting	Elsa Anne Campbell, Jouko Hynynen, Esa Ala-Ruona
2017	9	3	Vibroacoustic Therapy in the treatment of developmental trauma: Developing safety through vibrations	Marko Punkanen, Marjo Nyberg, Tiinapriitta Savela
2017	9	3	The Effects of Short-Term Vibroacoustic Treatment on Spasticity and Perceived Health Conditions of Patients with Spinal Cord and Brain Injuries	Eha Rüütel, Ivar Vinkel, Priit Eelmäe
2017	9	3	The Potential of Rhythmic Sensory Stimulation Treatments for Persons with Alzheimer's Disease	Amy Clements-Cortés, Lee Bartel, Heidi Ahonen, Morris Freedman
2017	9	3	Can Rhythmic Sensory Stimulation Decrease Cognitive Decline in Alzheimer's Disease?: A Clinical Case Study	Amy Clements-Cortés, Lee Bartel, Heidi Ahonen, Morris Freedman, Michael Evans, David Tang-Wai
2018	10	1	Group singing enhances positive affect in people with Parkinson's Disease	Amee Baird
2018	10	3	Listening to Music Improves Language Skills in Children Prenatally Exposed to Cocaine	Stephen W. Porges, Katherine E. Bono, Mary Anne Ullery, Olga Bazhenova, Andreina Castillo, Elgiz Bal, Keith Scott

Development of music therapy

This category is a work in progress, and requires further development. It currently combines many different areas that contribute to the development of music and medicine with

therapeutic aims, as foundational research not part of any of the previous sub categories. In some of these articles, here is theoretical development, which influence clinical thinking. In other articles, the focus of the research is not the music, but

specific variables influencing the experience of music such as the brightness [67]; or the development of new musical instruments [68]. Here we can also find articles that are correspond to different types of reviews, such as: model reviews [69]; bibliographic, literature and systematic reviews

[70-75]. Guidelines for specific practices or music-based interventions [76] currently correspond to this sub category too. (Table 11).

Table 11. *Development of music therapy in general*

Year	Vol	Nr	Article	Author/s
2009	1	2	From Ancient to Integrative Medicine: Models for Music Therapy	Suzanne B. Hanser
2009	1	2	A Reference Standard Bibliography: Music Therapy With Children Who Have Experienced Traumatic Brain Injury	Simon Gilbertson
2010	2	1	Interrater Agreement on the Nordoff-Robbins Evaluation Scale I: Client-Therapist Relationship in Musical Activity	John F. Mahoney
2010	2	3	Music, Noise, and the Environment of Care: History, Theory, and Practice	Susan E. Mazer
2011	3	4	Reporting Guidelines for Music-Based Interventions	Sheri L. Robb, Debra S. Burns, Janet S. Carpenter
2013	5	1	The Effect of Brightness on Listeners' Perception of Physiological State and Mood of the Music During Listening	Hyun Ju Chong
2013	5	2	A Proposed Model For Identifying Practices: A Content Analysis of the First 4 Years of Music and Medicine	Cheryl Dileo
2013	5	3	I Need to Hear Some Sounds That Recognize the Pain in Me: An Integrative Review of a Decade of Research in the Development of Active Music Therapy Outpatient Treatment in Patients With Recurrent or Chronic Pain	Julian Koenig, Marco Warth, Rieke Oelkers-Ax, Alexander Wormit, Hubert J. Bardenheuer, Franz Resch, Julian F. Thayer, Thomas K. Hillecke
2013	5	4	From Social Contact to Social Cohesion—The 7 Cs	Stefan Koelsch
2013	5	4	Meeting the Complex Needs of Individuals With Dementia Through Music Therapy	Concetta M. Tomaino
2013	5	4	Using Music to Treat Epilepsy in Children: A Review	Lung-Chang Lin, Rei-Cheng Yang
2014	6	2	Towards Prescribed Music in Clinical Contexts: More Than Words	Andrew Rossetti
2014	6	2	Applications of Clinical Improvisation and Aesthetic Music Therapy in Medical Settings: An Analysis of Debussy's 'L'isle joyeuse'	Colin Andrew Lee, Amy Clements-Cortés
2014	6	2	Does Singing Facilitate Social Bonding?	Gunter Kreutz
2014	6	2	Evaluation of the Standardized MUSIC.CARE® App in the Treatment of Pain: The U-Shape Composing Technique	Stéphane Guétin, Daniela Falvay, Gérald Chanques, Samir Jaber, Sylvie de Lattre, Bruno Souche, Patrick Giniès, Marie-Christine Picot, Christian Hérisson, Luc Brun, Emmanuelle de Diego, Jacques Touchon
2014	6	2	Music as Co-Therapist: Towards a Taxonomy of Music in Therapeutic Music and Imagery Work	Margareta Wärja, Lars Ole Bonde
2015	7	1	Expected Effects of Listening to Music Among Japanese and American College Students	Masako Otera, Yuichi Wada, Barbara L. Wheeler, Masayoshi Ichie
2015	7	2	Music Therapy's Development in Mental Healthcare: A Historical Consideration of Early Ideas and Intersecting Agents	Triona McCaffrey
2015	7	2	Culturally Transformed Music Therapy in the Perinatal and Paediatric Neonatal Intensive Care Unit: An International Report	Helen Shoemark, the WCMT 2014 NICU Music Therapy Roundtable Group
2015	7	3	Tracheomelodica: A Musical Device for Improving the Pulmonary Function of Laryngectomized Patients	Patravoot Vatanasapt, Nida Chabnak, Nichanun Punya-ek
2015	7	3	Music Making Interventions with Adults in the Forensic Setting – A Systematic Review of the Literature – Part I: Group Interventions	Biljana Vrancic Coutinho, Anita Lill Hansen, Leif Waage, Thomas K. Hillecke, Julian Koenig
2015	7	4	Music Making Interventions with Adults in the Forensic Setting – A Systematic Review of the Literature – Part II: Case Studies and Good vibrations	Biljana Vrancic Coutinho, Anita Lill Hansen, Leif Waage, Thomas K. Hillecke, Julian Koenig
2016	8	1	Understanding Music Care in Canadian Facility-Based Long Term Care	Bev Foster, Lee Bartel
2016	8	2	Integrating Music and Imagery in Music Therapy Clinical Practice	Annie Heiderscheit
2016	8	2	The Bonny Method of Guided Imagery and Music for Medical Populations: Evidence for Effectiveness and Vision for the Future	Cathy H. McKinney, Denise E. Grocke
2016	8	2	An Overview of the Bonny Method & Its Use in Palliative Care Settings	Amy Clements-Cortés
2016	8	3	The Role of Culture in Music and Medicine: Considerations to Enhance Health	Sue Baines
2016	8	3	Addressing Community Concerns through Music	Penny A Brill, Emily Menhorn

2016	8	3	The Effects of Music Therapy on the Prosocial Behaviors of Adults with Disabilities	Haley Rochelle Baumgarten, Barbara L Wheeler
2016	8	3	Optimizing music in complex rehabilitation and continuing care: A Community Site Facility Study (Part 2 of 3)	Michelle Nelson, Bev Foster, Sarah Pearson, Aimee Berends, Jennifer Ridgway, Renee Lyons, Lee Bartel
2016	8	4	Music Therapy and Stroke: An Integrative Review	Jamee Ard, Barbara L. Wheeler
2016	8	4	Integration of Spirituality, Music and Emotions in Health Care	Frances Hendriëheta Le Roux, Christof Sauer
2016	8	4	Multimodal Imagery in Music: Active Ingredients and Mechanisms Underlying Musical Engagement	Harry Ballan, Anna Abraham
2016	8	4	10 Domains of Music Care: A Framework for Delivering Music in Canadian Healthcare Settings (Part 3 of 3)	Bev Foster, Sarah Pearson, Aimee Berends
2017	9	1	Music Therapy in Addictions Treatment: A Systematic Review of the Literature and Recommendations for Future Research	Kathleen M. Murphy
2017	9	1	Music Therapy with Addiction and Co-Occurring Disorders	Victoria Policastro Vega
2017	9	1	Stage Two Recovery for Substance Use Disorders:	Jim Borling
2017	9	2	The Effects of a Program Combining Exercise and Music on Promoting Exercise Continuance and Psychological Factors in Older People	Hiromi Sakai, Naoto Kamide, Masahiro Kohzuki
2017	9	2	Protocol for a Neurophenomenological Investigation of a Guided Imagery and Music Experience (Part I)	Andrea McGraw Hunt
2017	9	2	Protocol for a Neurophenomenological Investigation of a Guided Imagery and Music Experience (Part II)	Andrea McGraw Hunt
2017	9	2	The Chalice of Repose Project’s Music-Thanatology History and Praxis	Therese Schroeder-Sheker
2017	9	3	Vibroacoustic Stimulation and Brain Oscillation: From Basic Research to Clinical Application	Lee R. Bartel, Robert Chen, Claude Alain, Bernhard Ross
2017	9	3	Vibroacoustic Treatment Protocol at Seinäjoki Central Hospital	Jouko Jouko Hynynen, Virpi Aralinna, Maire Rätty, Esa Ala-Ruona
2017	9	4	Music therapy for neuropsychiatric symptoms in the general hospital: a systematic literature review	Carol-Anne Sherriff, Jillian Mathews, Emma L Reynish, Susan D Shenkin
2017	9	4	Non-pharmacological approaches to dementia: An overview of foundations & considerations	Linda Carozza, Lisa-Marie Serrone, Lara Sugatan
2017	9	4	Music Therapy and Procedural Support: Opportunities for Practice	Laura E Beer, Kathrine V Lee
2018	10	1	Using music and medicine research to inform music psychotherapy practice	Heidi Ahonen
2018	10	1	When the Composer Has PTSD: Examining the Life of George Lloyd (1919-1998)	Jonathan Davidson
2018	10	2	Environmental Music in a Hospital Setting: Considerations of Music Therapists and Performing Musicians	Jing Wen Zhang, Mary A Doherty, John Francis Mahoney
2018	10	3	Trauma-informed Care in the NICU – Implications for Parents and Staff	Mary Coughlin McNeil
2018	10	3	Moral Injury and Music Therapy: Music as a vehicle for access	Torrey Gimpe
2018	10	3	Trauma, Disability and the "Wounded Healer"	David L. Abbott
2018	10	3	Music Related Sensibilities in Trauma Treatment: An interview with Janina Fisher	Andrew Rossetti, Janina Fisher, Marija Pranjic
2018	10	4	Music Treatment for Anhedonia in Major Depressive Disorder: Implications for Therapeutic Interventions	Aaron Cheng
2018	10	4	Clinical music study quality assessment scale (Musiquas) 1st edition	Artur Jaschke, Laura HP Eggermont, Sylka Uhlig, Erik Scherder
2018	10	4	Music therapy in neonatal care: a framework for German speaking countries and Switzerland	Friederike Barbara Haslbeck, Monika Nöcker-Ribaupierre, Marie-Luise Zimmer, Leslie Schrage-Leitner, Verena Lodde

Other music and medicine related

This category was also created due to common appearances of articles that involve descriptions of music and medicine aspects that neither describe specific practices for medical patients or staff, or foundational research. In this category there are 8 sub categories: (17) *country overview*, in which authors describe the overview of music and medicine or music therapy within their specific country or setting; (18)

conferences, involving publications that describe or talk about past or future conferences related to music and medicine; (19) *medical variables* such as environmental variables [77,78], or other variables such as burnout [79]; (20) *development of music therapy in a new context* describe the work focused on the insertion of music and medicine in a new country, city or area, and usually the process behind it; and (24) *book reviews*. Articles in this category can be found on Table 12.

Table 12. *Other music and medicine*

Year	Vol	Nr	Article	Author/s	sub cat
2009	1	2	Music and Medicine in Ireland: A Vibrant and Developing Community of Practice	Jane Edwards	17
2011	3	4	The Effect of the Flotation Version of Restricted Environmental Stimulation Technique (REST) on Jazz Improvisation	Oshin Vartanian, Peter Suedfeld	17
2012	4	2	Country Feature: Music and Medicine in Austria	Vera Brandes, Claudia Fischer, Zahra Taghian	17
2012	4	2	The Power of Music in Medicine and Health Care: International Association for Music & Medicine Thailand, July 3-6, 2012	Jane Edwards	17
2012	4	3	The Santa Fe Model: Music, the Brain, Medicine, and Wellness—A Scientific Dialogue Exemplifying Integrative Forums for Critical Topics	Derek DeVelder	18
2013	5	1	The Sound of Urgency: Understanding Noise in the Emergency Department	Julienne Ortiga, Sangarapillai Kanapathipillai, Barbara Daly, Julieanne Hilbers, Wayne Varndell, Alison Short	19
2014	6	1	Developing Music Therapy as a Professional Allied Healthcare Discipline: The Task Ahead for the Association for Music Therapy, Singapore	Melanie Kwan, Ng Wang Feng, Christal Chiang, Hui Ming Ming Loi, Evelyn Lee, Ashley Spears, Lee Peng Patsy Tan, Audrey Ruyters-Lim	20
2014	6	1	Music Therapy at SingHealth	Lee Peng Patsy Tan, Ashley Marie Spears, Melanie Kwan, Hei Loi Christal Chiang	20
2014	6	1	The Birth of the Malaysian Society for Music in Medicine: A Concerted Move to Promote the Use of Music for Therapeutic Purposes	Sharon Yin Zi Chong, I-Wei Foo, James Lai Hock Yeow, Geraldine Ming Ming Law, Johnson Stanlas	20
2015	7	1	Allison's Brain by Allison Wojiwada & Robert McMechan	Amy Clements-Cortés	24
2015	7	3	Bridging Familiarity with Unfamiliarity: The Use of Music Therapy to Normalize the Pediatric Hospital Environment	Shawna N. Vernisie	19
2015	7	4	North-American Conference Highlights the Treatment of Trauma Utilizing Guided Imagery and Music	Suzannah Scott-Moncrieff, Bolette Daniels Beck, Erin Montgomery	18
2015	7	4	Therapeutic Songwriting: Developments in Theory, Methods, and Practice by Felicity A. Baker	Robert E. Krout	24
2016	8	1	Music Therapy Handbook by Barbara Wheeler	Meganne K. Masko	24
2016	8	1	Music Therapy in China	Jing-Wen Zhang, Tian Gao, Ming-Ming Liu	17
2016	8	1	IAMM Conference 2016	IAMM 2016	18
2016	8	2	Guided Imagery and Music (GIM) and Music Imagery Methods for Individual and Group Therapy edited by Denise Grocke and Torben Moe	Liz Moffitt	24
2016	8	3	Cerebro y Música. una Pareja Saludable (Brain and Music, a Healthy Couple) by Jordi A. Jauset	Oscar Bedford	24
2016	8	4	Voices of the Dying and Bereaved: Music Therapy Narratives by Amy Clements-Cortes & Sara Varvas Klink	Brian Schreck	24
2017	9	1	The Oxford Handbook of Music Psychology by Hallam, S., Cross, I., & Thaut, M.	Patsy Tan, Ng Wang Feng	24
2017	9	2	Music Therapy Training Programmes in Europe: Theme and Variations. (2016). Edited by Thomas Stegemann, Elena Fitzthum, and Tonius Timmermann	Amy Clements-Cortes	24
2017	9	3	Music Therapy Research: Third Edition (2016). Edited by Barbara L. Wheeler; Associate Editor: Kathleen M. Murphy	Grace Anne Thompson	24
2017	9	4	Burnout: Why Doctors Need Music	Madeleine Alberdi, Joseph Schlesinger	19
2018	10	1	Music and Medicine in Spain: History and New Developments of a Growing Discipline	Nuria Escudé, Fabrizio Acanfora	17
2018	10	1	Clinical Training Guide for the Student Music Therapist: 2nd Edition Polen, Donna, Shultis, Carol, & Wheeler, Barbara (Eds.)	Darlene Brooks	24
2018	10	4	Perceptions on the functions of music among professionals in the special education field in the United Arab Emirate	Khadejah Ahmed Bamakhramah, Hyun Ju Chong, Juri Yun	17

Reflections

This last category was created due to a now recurrent type of publications that started in 2014, and that open up a forum for the expression of a more human and artistic side of the collaborators of *Music and Medicine*. This kind of publication includes at times, audio files [80], or a response, sometimes in the form of a poem, that surge while working within the music and medicine field. It is an innovative category that opens up the possibilities of thinking also on the caregivers or the people behind the publications part, and specially and intentionally on self-care, which is often forgotten.

Table 13. Reflections

Year	Vol	Nr	Article	Author/s
2014	6	2	In Memory of Dr. Helen Bonny (1921-2010)	Barbara Hesser
2015	7	2	The Sound of Deafness: Smetana and Traumatic Tinnitus	Alexei Pesic, Peter Pesic
2016	8	2	Music Imagery Beyond a Cancer Diagnosis	Louise Dimiceli-Mitran
2016	8	3	Violins of Hope	Marjorie Lee Jacobs
2016	8	4	Comparing the Clinical Course of Tuberculosis with the Musical Flow of Chopin’s Prelude No. 4	Vernon Hoepfner
2017	9	1	Digesting Losses	Marjorie Lee Jacobs
2017	9	4	The Social Representations of Psychiatry and Mental Illness Examined Through the Analysis of Music as a Cultural Product	Fabian Pavez, Erika Saura, Gemma Pérez, Pedro Marset
2017	9	4	Music Connects	Marjorie Lee Jacobs
2018	10	2	Actually, Music Therapy does work	Alan Turry
2018	10	3	I am still alive	Amy Clements-Cortes
2018	10	4	The Medicine of Salsa	Marjorie Lee Jacobs

Keywords analysis

As a way to understand, along a different route, the type of contents and the most common themes that are being published in *Music and Medicine*, all of the keywords used for every single article were analyzed using a simple phrase frequency analysis with a software written on *Python*, a programming software, specifically designed to do this task, for this article. The software was programed to look not at individual words, but to complete sentences, or “keyword clusters”. A word frequency analysis was discarded due to the large amount of overlapping. For example, in a word frequency analysis, which can be done using a simple word

count in Microsoft Word or it can also be autogenerated automatically from a large list of keywords with a simple macro within MsWord, a word like “music” for example, would come up as a the highest frequency word, with a total of 306 mentions. The word music is used in quite a lot of the keyword clusters, but it not always represents the same themes; it can be sometimes just *music*, or it can be *music therapy*, or even *music instrument*, among others. Therefore, by taking every word group between commas (keyword clusters) on the keywords the software was able to present results that reflect better the most common types of contents, and results can have a more accurate interpretation. For software ease of reading reasons, many of the words are shown uncapitalized on the lists (Table 14 and Appendix 1).

This brief keyword analysis does not take into consideration each of the single categories and sub categories mentioned prior, and does not reflect anything else but the frequency of a keyword cluster. Such information won’t provide details on which is the most relevant or important theme in the field on *Music and Medicine*, but can provide some light into knowing in which direction the research being developed the most, and which areas are not so commonly discussed.

The keyword clusters reflect clearly the depth and vastness of the field. There are a large number of variables being considered within all of the 323 articles published, adding a total of 716 keyword clusters. All keyword clusters with a frequency higher than 3 can be found in Table 14. The complete list can be seen in Appendix 1.

Table 14. Keyword frequency (n>3)

Keywords	Frequency
music therapy	101
editorial	45
music	42
music medicine	25
palliative care	13
pain	11
anxiety	10
singing	9
trauma	9
stress	9
book review	9
emotion	9
relaxation	9
children	8
depression	8
music psychotherapy	8
cancer	8
procedural music therapy	7
creative arts therapy	7
medical music psychotherapy	7
clinical improvisation	7
ptsd	7
heart rate variability	6
neurologic music therapy	6
neurorehabilitation	6
dementia	6

quality of life	6
nicu	6
music listening	5
reflection	5
mood	5
arts medicine	5
vibroacoustic therapy	4
music and medicine	4
autonomic nervous system	4
rehabilitation	4
cognition	4
musicians	4
music intervention	4
music improvisation	4
music and imagery	4
older adults	4
Nordoff-Robbins	4
entrainment	4
heart rate	4
music care	4

The most common keyword cluster used is *music therapy*, appearing a total of 101 times, followed by *editorial* (45), *music* (42), and *music medicine* (25). All of these reflect the orientation and main type of contents of *Music and Medicine*. The next keyword clusters reflect topics that are commonly discussed not only within practice but also within the research published, as well as in the other categories presented previously in this article. *Palliative care* (13) is a topic that is discussed often and a field where it is usual to find music therapists working [30-32,81].

Phrasing of keyword clusters need to be taken into consideration, since herein there are some mild differences that can result in overlapping. For example, an in-depth analysis could conclude that *Guided Imagery and Music* (3), *The Bonny Method of Guided Imagery and Music* (3), *GIM* (3), *guided imagery* (2), *guided imagery and music (bonny method)* (1) and *bonny method of guided imagery and music (gim)* (1) should all be considered as part of the same keyword cluster. The same applies for *music medicine* (25) and *music and medicine* (4). Though some of this keywords that are currently not considered as part as the same keyword cluster might be more obvious than others, yet such an analysis requires a more in depth look at all of the published articles, their complete contents and the way the information is distinctly treated within them.

As mentioned earlier, the purpose of this analysis was to understand the type and frequency of the contents and themes within the field of music and medicine as published in this journal and does not reflect any type of hierarchy among the keyword clusters.

*As Editorials reflect the content of the articles, they were not part of the formal analysis, only the keyword analysis

Discussion

This article’s objective was to gain perspective over the content that has been published over the past 10 years in *Music and Medicine*, by initially following Dileo’s original content analysis of the first 4 years [1] as a take-off point. One of the things to keep in mind is that Dileo’s article was presenting a model of the practices that emerge from the interface of the fields of music and medicine [1]. In such an effort, several articles were not considered, since the purpose of that analysis was to present a model for the practices. General or historical articles, conference reports, descriptions of practice in specific countries, and guidelines, plus several other articles that were outside the boundaries of that model were not classified.[1] In the current article, the goal was to look at all of the articles published in this journal, and to find a way to categorize the vast amounts of information without excluding any publication, editorials, book reviews and conferences, among others, included. There appears to be valuable information about the interface of music and medicine just by looking at a journal that has been publishing content steadily since 2009. This categorization was not developed in order to include the whole universe of publications within the field, and it also present a lot of challenges and limitations.

A challenge that stands out amongst others is the overlapping between categories and sub categories. Many articles, if not most of them, consider not only a single variable, but sometimes describe a music and medicine practice as it occurs in its context, and even research situations, which might be closer to a laboratory scenario, tending to look at several variables in a complex way. Though an effort has been made into trying to establish a standard to assign toward one category or another for each article, it is difficult to know exactly how many articles correspond entirely to each category. This is accentuated when we look at sub categories, especially in the *foundational research* category.

Another path for classifying the publications could have been to assign more than one sub category to each article where there is an overlap. This might provide a more accurate picture of the frequency in which each topic is being discussed or written about. On the other hand it can present a risk in making the data less clear and more complicated to look at.

This is where the keyword clusters analysis comes in handy. Since this analysis does not consider anything but each individual cluster as a unit, this can provide an accurate picture of the frequency in which the many different topics are being mentioned. Of course, there are some limitations regarding this analysis, yet it can also provide a clear path towards having a more unified set of keywords that can facilitate such an analysis later.

This article also provides an entry point toward some aspects that can be looked at in a more in-depth way, as it is

with the category of *foundational research*, and the new suggested categories and sub categories. A further effort into classifying articles that fall under the *development of music therapy* sub category can provide more light into how the field of music and medicine is being developed. Another interesting route to explore is through the keyword clusters, by looking into this information by category or even by sub categories, a more complex perspective can be obtained. On the same side, an in-depth look at the large amount of information on the keyword clusters in order to avoid the division of clusters that can belong to the same cluster but are not due to phrasing can be beneficial. Such information could help to create a common language for keywords and could help find common terminology within similar topics. As mentioned earlier, an analysis like this does require a look at the contents of each article and how the information is being treated in order to make sure that keyword clusters can be combined without sacrificing relevant nuances.

Another interesting route, and a next step for a keyword cluster analysis, is to see by what clusters follow most commonly the most frequent clusters. Maybe, though this is mere speculation, there are clusters that are often together, such as *palliative care* and *anxiety* for example. There are many possibilities that leave an exciting path for our readers to explore!

Another limitation within this classification effort is that the articles were classified by a single examiner where a multi examiner classification would likely be more accurate. None the less, even though this article considered Dileo's former content analysis [1], the data within it was not examined until articles were already classified. In most cases, articles fell under the same category that had been assigned in Dileo's article's stratification themes which means that there is more congruence than it may seem.

There are several other variables that can be looked at when viewing 10 years of publications, such as from which countries are the authors publishing in *Music and Medicine*. A classification like this would probably reflect on the quick growth of the field over this past decade and this particular journal's quest to support the IAMM's mission of helping to 'grow' the practice of music and medicine in developing countries.

Conclusion

An effort to classify 323 articles and 716 keyword clusters in 10 years of publications does present many challenges, yet it also provides valuable information of the trajectory in the interface of music and medicine as analyzed through a decade of articles.

As predicted by Dileo, and the current Editors of the journal, music and medicine practices have increased through recent years and documentation of this process through

research continue to expand our comprehension of the benefits of working with music in the medical field.

Hopefully this classification effort will contribute towards understanding this field a little bit better, and it will inspire future research. There is a large number of topics that are not yet included either at any category or keyword cluster, and where music therapists, physicians, psychologists, among many other professionals are providing unique interventions involving music. With any luck, coupled with due diligence, our capacity in being able to have some perspective over what has been published over the past 10 years in *Music and Medicine* will inspire more authors to join with their own research quests to take initiatives to publish in *Music and Medicine*.

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Biographical Statements

Erik Baumann, MMT is the Production Editor of *Music and Medicine*, member of the Board of Directors of the International Association for Music and Medicine; a music therapist and psychologist who has worked and presented and published his work globally. He spent several years as a research scholar at the Louis Armstrong Center for Music and Medicine in New York, and has been working over the last 5 years in the development of music therapy in his native country of Peru, where he works in his private practice.