

A Random Walk Out of Pandora's Box or Respite Finem?

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Editorials should have the capacity to provoke discussions. As editors of this integrative journal, we take this to task, seeking to pick up innovative topics, provoking statements, and to generate creative ideas implementing the most recent developments which are not only restricted to the area of music in medicine but also have concern for issues of general interest in science and health care. In doing so, we are ever eager to receive responses from our readership and to continue to dialogue and open up public discussion about issues of mutual interest. One actual perpetual burning question to direct our attention toward is that of research misconduct, involving scientific malfeasance, and faked data, which we believe call upon the research community to harvest new measures that secure research integrity.

The use of fabricated data in scientific research and in publications is one of the most severe, often even life-endangering threats to humankind. When the University of Connecticut¹ recently released the report of its 3-year investigation of the laboratory of a prominent faculty member that 145 counts of fabrication and falsification of data had been committed, this may have caused upset for the scientific community and the taxpayer who sponsored that research. The scientific community and the public both were struck by recognizing how widespread the phenomenon of scientific misconduct really is.^{1,2} In 2011, about 100 papers published in peer-reviewed high-index journals had to be retracted. Massive data fabrication, technical errors, and sloppy techniques were identified only after publication. Even worse, prior to being retracted for concerns regarding data collection or conclusions, these publications were cited several hundred times in other publications, leading to widespread uncertainty and mistrust in various scientific fields such as social behavioral research, virology, and chronic fatigue syndrome, longevity research, and climate change. The year 2010 had already seen retractions of publications by quite a number of high-ranking scientists from various faculties around the globe.²

Connected with this question is the issue of peer review. There is not yet evidence of its effectiveness in uncovering falsified data, but it obviously uncovers flaws in some instances.³ But one wonders whether there might be any other system available which could better serve the purpose of science integrity? As editors we have not identified a better system. Scientists are human beings and as such are perhaps no better than other professionals in their quest for pursuits of moral, ethic,

and trustworthy integrity. Research activity involves a perpetual and sometimes frustrating venture in its attempt to uncover the truth. Sometimes indeed evidence may be mistakenly understood as "truth." If there is one finding that has become substantiated from the scandals of the last years, it is that there is not one truth. We must come together and seek to keep Pandora's box closed as tight as is humanly possible.

A second Pandora's box that has been opened just recently involves what Heather Douglas calls "The Dark Side of Science."^{4,5} It is about scientists' responsibility for the foreseeable consequences of their research, for the good or the bad, for instance, the biohazards invented through biological research or new pathogenic bioweapons such as highly contagious N1H5 virus (avian influenza, bird flu). Contamination of native gene pools in our global environment through bioengineering tissues, plants, or even creatures with new, desired characteristics are examples under discussion. The important question remains whether we are responsible for the potentially negative impacts of our research. Are we, as researchers responsible to keep Pandora's box tightly closed? We say yes, we are.

To be clear, these themes involve issues that are not solely our responsibility as researchers. But to a large extent they are, more than we might want to admit and realize as a community. If scientific knowledge of how to bioengineer a supercontagious H5N1 bird flu virus enables terrorists to conduct a disastrous biological attack on our society, the terrorists of course are first responsible for the foreseeable consequences of their actions. But would the researchers from Erasmus University, the Netherlands, and from the University of Wisconsin, who gained that knowledge of how to build the virus, take on some responsibility? Is it naive to believe people will only use the knowledge we generate for the good of humankind? One spectacular example could indeed be the recent construction

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of a H5N1-based new virus that is as dangerous as Ebola. The scientists being “responsible” say they do their research for curing and preventive purposes. But opening such a Pandora’s box might prove deleterious even as all scientific standards were followed. If these “risks of dangerous research” as Ghose wrote⁶ made it necessary for the American National Science Advisory Board for Biosecurity to publically demand from those researchers involved not to publish specific details of the methodology used, we must say that great care must be taken. And we must realize particularly, in these current times of the Internet, that the genie is already out of the bottle and the research is published with the push of a button. When the research is complete, it may be too late to contain potentially disastrous consequences. There is risk even in circumstances where results may never be announced officially.

We hope to not be giving a limited impression, because we believe, obviously that high-risk research has to be conducted. Its purpose, either to identify preventive measures or to evaluate ideas that “are dubbed too novel, that span too diverse a range of disciplines, or are at a stage too early to fare well in the traditional peer-review process” (cited from Scudellary⁷). The National Institutes of Health (NIH) do fund such research generously through a Director’s Pioneer Award. Only in 2011, according to Scudellary, the NIH invested about \$100 million in visionary research programs through its 4 high-risk grant programs (the Pioneer Award, the Innovator Award, the Transformative R01 Program, and the Eureka awards). This is commendable and will further our capacity to learn and grow. No knowledge is acclaimed without certain risk.

Considering the level of risk incurred in our field of special expertise, the—let us call it—functional, healing, and/or intentional application of music, should we not be aware that there are applications that are contrary to our intended goals? We see extreme examples of this in confined societies, such as the use of musical stimuli to manipulate ethical limits and emotional barriers in combat such as in Afghanistan. The use of musical stimuli to alleviate pain and distress in high-performance athletes may be neglectful of overstrain injuries. How about the use of subliminal music in marketing to increase consumer spending? These are three examples of musical applications which we know of and which involved contraindications of music but that have not been considered in the literature related to medicofunctional use (or disuse) of music.

Data proving the efficacy of musical stimuli in gaining information through torture are rarely published. The war in Iraq and Afghanistan has however produced some public information of that dark side of musical science. Scientific data acquisition in this field is as unacceptable as torture itself. As Douglas puts it, “as long as there is freedom of research, there is the responsibility that comes with it.”⁵

A third complex set of questions arises in this context and it encircles the terms “epigenetics” and “personalized medicine.”

In medical schools as well as in all academic training programs that have therapeutic professions such as music therapy, there is an emphasis on “appropriate” treatments for the

average patient (the norm). However, experienced professionals know quite well that each patient is unique, thus displaying individually distinct responses to treatment. This includes the individual responses that include patients’ undesired side effects or fatal complications. During the last couple of years, at last it is recognized that such empirical bases of our work is critical to consider. Currently, as a result, we are seeing the introduction of the so-named individualized medical care and personalized medicine⁸ has become a high-priority issue in health care politics and related research. Recent findings in genomics and more specifically in genetic variations as well as in epigenetically based behavioral variations highlight the need to evaluate treatment modalities through scientific research considering such individualized care.⁸

What are the Implications for Music Therapy and MusicMedicine?

First of all, such findings stress the necessity for qualitative research to clarify the quantifiable. For many years that part of music therapy–related research was somehow looked at as anecdotal and had often an image ranging from alternative to esoteric as seen by traditional medical and scientific community. This has changed.

Still, some critique can be heard that complementary, alternative, or integrative medicine may lack evidence to support the effectiveness of its methods and treatments. But even in pharmacological research, where randomized-controlled trials (RCTs) have been acknowledged as “gold standard,” this approach shows significant deficits, limitations, and cheating, as discussed earlier.^{9,10} As Überall puts it, “the absence of evidence is not the evidence of absence.”¹⁰

In the current climate, gut feelings, better called intuition, which can often be the result of familiarity stemming from years of practice evidence, can be solid ground for innovative scientific research ideas in this sense, and can be the grounds for support treatment approaches. If we see that about 90% of all medical treatments are not RCT based and bring in members of the team, such as psychologists, we find that intuition is a basis and a basic input into complex moral judgments,¹¹ so how can one classify such thinking in medicine as “alternative”?

And yet, moving our thinking in another way, one could ask whether at least some parts of what we all do in health care more or less is a kind of random walk out of Pandora’s box. Discussion is lively and still open, including all subjects and all levels of science. But there is consent among the majority of scientists that here and now is the time and that there is an apparent need for more thorough oversight in potentially dangerous areas of research to ensure that risks do not outweigh benefits.

Primum nihil nocere is the central message of the Hippocratic Oath, and there are referring ethical standards in all therapeutic professions. Perhaps it is necessary to think about a Hippocratic Oath for scientists, too?

In order to stop a random walk out of Pandora’s box, we will not be able to close the box tightly and completely as we are

curious humans. But we need to find a way to stop the random walk and find global standards to secure beneficial outcomes.

At this point, we want to ask our readership to share their ideas about what areas of research in Music Therapy, Music Psychology, and MusicMedicine deserve more careful scrutiny and to consider how such processes could be identified and standardized. Let us do what our ancestors already demanded: *Respite finem!*

This issue of *Music and Medicine* is devoted to integrative aspects of practice and research. It includes work undertaken by teams of doctors, music therapists, and researchers who are committed to enhancing the knowledge of integrative medicine in theory, perspective, and practice.

Two articles in this issue address music treatment strategies and innovative programs with distinct populations. The article by Alexander Wormit, Marco Warth, Julian Koenig, Thomas Hillecke, and Hubert Bardenheuer evaluates a treatment manual for music therapy in adult outpatient oncology care. Wormit and his team examine the use of active music therapy treatments, which are currently not so commonly studied in the literature. This study measures prescores and postscores of pain intensity, quality of life, and therapeutic outcomes which are based on their Phase Model of Psychotherapy Outcome, an innovative treatment manual that was developed for outpatient music therapy cancer care in Germany.

Marcia Holstad, Maya Baumann, Ighoverha Oforokun, and Steven Logwood's article evaluates the effects of their LIVE Network, which is an innovative audio music program instituted to promote antiretroviral therapy (ART) adherence self-management. They present results from their focus research. Using the patients' reactions to evaluate an audio program is an effective intra-analysis that helps them consider through discriminating surveyance the level of appeal and utility in the use of music in their therapy. At a time when many articles are absorbed in evidence from a broad perspective, Holstad and her team in this work are paying attention, in detail to the patients, and their assessment of the music experience. Music programs for persons living with HIV are few and far between in the literature base. This program addresses education and motivation with the broader goals being adherence and self-management.

Björn Vickhoff, Rickard Åström, Töres Theorell, Bo von Schéele, and Michael Nilsson address musical piloerection, which is a pleasurable human response that is particularly difficult to evoke in experimental settings. By accident, these authors were able to study how emotions correlate with dynamic experiencing within an event. This study provides groundwork and suggestions for how music effects piloerection, which could have interesting clinical indications for future assessment endeavors.

"Getting to the heart" of matters related to integrative music function in medicine is the unique topic of Robert Ellis, Julian Koenig, and Julian Thayer's article titled "Getting to the Heart: Autonomic Nervous System Function in the Context of Evidence-Based Music Therapy." These authors review both experimental and interventional literatures on

music and physiological response and focus their synthesis on the central and autonomic nervous systems and the associated implications for physiological, emotional, and cognitive health. Heart rate variability is a key mechanism discussed both as an example of this complex interplay and as a useful non-invasive metric for exploring the effects of music on distinct physiological response.

In advancing integrative aspects of care, through an overview of selected studies through time, Hans Trappe's article on "The Effect of Music on Human Physiology and Pathophysiology" provides an interesting review on the effects of music in human beings. The decisive scope of this review lies in its attention toward intertwining 2 essential perspectives: human physiology and pathophysiology. Through viewing music's effect and role within a variety of populations, ranging from pregnancy to geriatrics, from types of music used and the effects within a range of modalities, and what might be achieved under differing conditions in wellness and illness, Trappe provides a global understanding for his readers. We are brought to think about the conditions we select and variables we consider in designing our studies. This writing has a perspective-analytic tone. Trappe's conclusions about the type of music and conditions in which music-health outcomes are achieved prompt a stepping back for the reader. Although he cites studies on findings generating both positive and negative effects in illness and health, the continued aspect of context remains critical—both from scientific and cultural perspectives.

Finally, Vera Brandes and Jane Edwards conclude this issue with pieces devoted to the continuing and forthcoming activities of the International Association for Music and Medicine (IAMM). These articles share information which addresses aspects related to the scope and mission of the IAMM.

Vera Brandes, Claudia Fischer, and Zahra Taghian's Country Feature, which is a category of distinction unique to this journal, provides an overview of music in medicine and music therapy activities in Vienna, Austria, where the inaugural conference of the IAMM was held under her chairing with Gerhard Tucek, in 2010. This conference along with a decade's hosting of "Mozart & Science" events held every other year have sparked international interest particularly in the possibilities these events have provided. This inaugural IAMM event launched the opportunity for growth and gave anchoring for the many new IAMM member attendees in the vast areas that music and medicine research and clinical activity has and is currently forging worldwide. We are excited for our readers to know about the secrets of this country's success reflected in the growth of music and medicine that has been so creatively fostered by Brandes, Tucek, and their colleagues in Vienna. *Music and Medicine's* first Country Feature article occurred in 2009, and the country of feature was Ireland.¹²

Jane Edwards, IAMM's inaugural president, concludes this issue by providing us with a taste of what is next to come at the 2nd IAMM conference to be held in July 2-5, 2012, in Bangkok, Thailand. Readers are invited to learn about the distinguished program and host of activities which promise to be a

memorable event, marking months of work and preparation by the hosting committee and IAMM Board of Directors.

We welcome your feedback and continued submissions to *Music and Medicine*, and we look forward to continued dialogues in integrative topics that interest our readership. We are impressed by the range of topics, research trials, and interventions that continue to advance our thinking in this emerging field.

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