

The challenges and benefits of a genuine partnership between Music Therapy and Neuroscience: A dialogue between scientist and therapist

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1 **The challenges and benefits of a genuine partnership between Music**
2 **Therapy and Neuroscience: A dialogue between scientist and therapist**

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15 **Keywords:** Neuroscience; music therapy; debate; interdisciplinary; patients; clinical protocols

16

17 **Abstract:**

18 *Collaborations between neuroscience and music therapy promise many mutual benefits given the different*
 19 *knowledge bases, experiences and specialist skills possessed by each discipline. Primarily, music therapists*
 20 *deliver music-based interventions on a daily basis with numerous populations; neuroscientists measure*
 21 *clinical changes in ways that provide an evidence base for progressing clinical care. Although recent*
 22 *developments suggest that partnerships between the two can produce positive outcomes for both fields, these*
 23 *collaborations are not considered mainstream. The following dialogue between two experienced professionals*
 24 *from each discipline explores the potentials for collaborations, as well as the misconceptions that may be*
 25 *preventing further synergies from developing.*

26 Two professionals from different sides of the neuroscience and music therapy debate present an informal
 27 dialogue exploring realities and beliefs that have benefited or hindered collaborations. As a music therapist
 28 who has turned to neuroscience for evidence in neurological rehabilitation clinical practice, and a
 29 neuroscientist who has been motivated by the implications of her research for clinical populations, we present
 30 this dialogue in an interview format. This format was chosen to encourage genuine questioning and
 31 exploration of issues that are implicit to potential collaborations, and remain unexplored in empirical research.

32

33 **WM:** Lauren, in your view, how can music therapy contribute to the wider perspective of clinical practice and
 34 research?

35 **LS:** I think there is no question that the properties of music, in terms of intrinsic features, as well as the
 36 potential for engagement, emotional response and interpersonal communication, can be very powerful across a
 37 range of clinical situations. When used appropriately, music is ethically acceptable, side effect free, can be
 38 intricately tailored to personal preferences and tastes, and in some cases may provide a cost-effective
 39 alternative to pharmacological sedation (Loewy et al., 2006). Exploiting the potential benefits of music is not
 40 only essential for advancing clinical practice, but also in elucidating and characterizing how music acts on the
 41 brain. There is much to be gained from a joint enterprise where practice and research are can reciprocally
 42 inform one another.

43

44 But achieving such collaborations takes time: How do you think our respective disciplines are doing in this
 45 regard, Wendy? Are you sensing a significant productive collaboration in recent years?

46

47 **WM:** I think there are many interesting collaborations emerging that illustrate how a genuine partnership
 48 between the two professions can draw on the strengths of each to benefit research and improve clinical
 49 practice. One example is the new MANDARI collaboration (music and the neurodevelopmentally at risk
 50 infant) which has brought together researchers and clinicians from diverse disciplines to discuss the potential
 51 of music at the earliest possible state in life (<http://www.gold.ac.uk/mandari/>). The different disciplinary
 52 languages and frameworks are explicitly discussed to permit a platform for genuine interdisciplinary
 53 engagement, including scholarly critique of frameworks and assumptions that may be implicitly entrenched in
 54 our respective disciplines.

55

56 A number of studies provide models for collaborations between the two disciplines. To take just a few
 57 examples: Thaut et al. (2005) examined music as a mnemonic device for learning and memory with Multiple
 58 Sclerosis patients and its effect on neuronal synchrony; Särkamo et al. (2008) examined the impact on
 59 cognitive recovery, mod and brain activation following stroke and O’Kelly et al. (2013) explored brain

60 responses to music in patients with disorders of consciousness who cannot show behavioral responses. Studies
61 such as these demonstrate the potential of a combined music therapy/neuroscience approach to give insights
62 into “how” music works and “why” we see clinical improvements. The knowledge that stems from such
63 collaborations ultimately has the potential to improve interventions offered to patient populations.

64

65 However, I personally feel that the potential synergies between our two fields have yet to realize their full
66 potential. I’ve been working in music and neurology for around 25 years and certainly I’ve wanted to engage
67 with neuroscientists to a greater degree, particularly through my work with complex, brain-damaged
68 populations. As a clinician, I have found reading the neuroscience literature invaluable for drawing out
69 relevant information in order to both inform my own understanding of the brain and, where possible, apply it
70 in an evidence-based way in practice with clients.

71

72 Personally, I have been able to build relationships with individual neuroscientists where we have a common
73 interest in clinical populations. However, these relationships have not been able to develop in more systematic
74 ways. We largely read different journals, go to different conferences and belong to different societies.
75 Although music therapists are increasingly attending more neuroscience-based conferences and publishing in
76 neuroscience journals, there is very little infrastructure to allow these two disciplines to interact in ways that
77 can reciprocally inform each other. Perhaps you have thoughts on how we might advance collaborations and
78 dialogue? What do you feel has been a barrier to collaborations to date?

79

80 **LS:** As you say, there are enormous challenges to interdisciplinary working, which is easy to express support
81 for but more difficult to realize! My recent involvement with the MANDARI collaboration showed me that not
82 only do we speak very different languages but we also have very different motivations for our involvement,
83 and what counts as an interesting question or goal for one person, can seem less important to others. It’s hard
84 to articulate our deep-seated motivations, but an honest exchange of where each party is coming from is vital
85 to ensure people are not pulling in different directions without even realizing it.

86 Added to this is the fact that many areas of clinical practice might remain hidden to the research community,
87 since many clinicians do not have the time or resources to conduct or publish research. They might
88 communicate it within their local practice-based networks only. This can provide a skewed picture of what is
89 actually going on clinically, which often does not reflect the breadth of practice and associated theories and
90 frameworks that are being used.

91 Special initiatives, such as this *Frontiers* issue, can provide a platform for knowledge exchange, as can seeking
92 out opportunities to understand more about the very different worlds each of us inhabit. But ultimately, the
93 most productive collaborations will be motivated by individuals who have a vision of how research and
94 practice can complement one another, and who work from a grass roots level to make it happen.

95

96 Perhaps we could consider the different kinds of motivations that typically drive clinicians versus researchers
97 – what are your thoughts on that?

98

99 **WM:** A primary motivation of a music therapist is to improve clinical methods in order to benefit the patient.
100 Therapists are very much at the coalface, working with people who do not have straightforward types of
101 pathologies; this is typical in catastrophic brain injury. They do not have neat lesions in one area of the brain,
102 they have complex problems, and they’re all different.

103

104 For music therapists, the drive to do research is prompted by what happens in the therapy room during the
 105 clinical intervention. Therapists are interested in questions about “what is it that works?” and “which process
 106 works best for that patient?”. Often they work so closely with the patients and their families, they have
 107 difficulty in standing back and looking at the bigger picture, which is necessary for a researcher. Lauren, do
 108 you feel this is a barrier for neuroscientists engaging with the music therapy profession in research
 109 collaborations? Perhaps it is easier for neuroscientists to do this, since they are less engaged in directly
 110 working with patients?

111

112 **LS:** As you say, one of the important issues for music therapists, is obviously the individualized, tailored
 113 approach, while, for researchers, group designs where an intervention can be implemented in the same way
 114 across a group of patients, is often preferred. This may involve abstracting something personal and bespoke
 115 into a ‘one size fits all’ approach that may, in the end, turn out to be less relevant and less effective for the
 116 patient group. So there’s a tension between an intervention, which may be idiosyncratic and highly
 117 personalized from one patient to the next, with the need for a design that incorporates standardization and
 118 replicability. It’s possible to have a design that incorporates a tailored approach, and can be analyzed in a
 119 statistically robust way, but such an approach is not orthodox for most neuroscientists.

120

121 **WM:** Indeed. I should add, the type of well-controlled protocols that neuroscientists are used to challenge
 122 real-world settings on two fronts. First, if a protocol does not meet a patient-centered need that the patient or
 123 the therapist feels is most important (e.g. an emotional need over a functional need such as hand grasp), then
 124 the clinician and the patient lose motivation to continue. There are also ethical questions about using protocols
 125 that are not best suited to patient needs. Second, music is a medium that provides opportunities for
 126 spontaneity and play, which are both important features in therapy, learning and rehabilitation. These features
 127 can be challenging to incorporate into a controlled protocol.

128

129 Music Therapists in recent years have become more involved in research to generate evidence, particularly
 130 with randomized controlled trials (RCTs), which are considered one of the highest forms of “evidence” in
 131 health care. RCTs are challenging on a number of fronts; one of which concerns the difficulty of formalizing
 132 the intervention in terms of a standardized protocol. We know that this is one of the criticisms that
 133 neuroscientists have of Music Therapy. Ultimately, therapists have been trained to view each client as an
 134 individual, and tailor intervention to that individual. Adopting standardized protocols can be seen as not taking
 135 account of individual differences and treating that person as a unique being.

136

137 This is one reason why RCTs are difficult to do in practice and are rarely the best method for getting at
 138 complexity, for instance, researching rehabilitation after catastrophic brain injury where single-subject designs
 139 are more suitable. But, on the other hand, if we completely reject the notion of RCTs altogether, we risk
 140 missing the opportunity to engage in testing out the efficacy of music therapy interventions, using research
 141 designs that are widely recognized as the “gold standard” in health care. An alternative is to do an RCT where
 142 protocols are defined in a way that enables flexibility. For example, one protocol, which has been written for
 143 working with children with Autism spectrum disorders, defines a complex intervention of improvisational
 144 Music Therapy (Geretsegger et al., 2012). This is a challenging intervention to protocolize as it draws on
 145 musical spontaneity and play to improve specific non-verbal communicative behaviors typical with this
 146 population. The protocol manages to describe the intervention procedures with enough precision to enable a
 147 trained therapist to deliver the intervention but also allows for spontaneity in response to the client’s musical
 148 and communicative behaviors.

149

150 **LS:** Another example of an RCT, that has a flexible implementation, can be seen in study where parents were
151 trained to deliver live Music Therapy in the neonatal intensive care unit (Loewy et al., 2013). Although the
152 parents had been trained broadly, along similar lines, the detail of delivery was rather different. So you don't
153 always need to disregard the lived experience when you are doing research, you just need to be a bit clever
154 about it.

155

156 In relation to this, I'm aware that for most scientists, the Cochrane Reviews
157 (<http://www.thecochranelibrary.com/>) would be the first port of call in trying to establish whether Music
158 Therapy was deemed effective for a particular clinical group. With their reliance on RCT designs, is there a
159 danger that some high quality Music Therapy studies are being overlooked?

160

161 **WM:** The Cochrane Reviews are considered the "gold standard" and they evaluate all the quantitative
162 research that has taken place on an intervention with a specific population, e.g. Music therapy for Acquired
163 Brain Injury (Bradt et al., 2010). However the inclusion criteria used to evaluate research studies are very
164 narrow. This means that many studies that present a compelling argument for the effectiveness of Music
165 Therapy in a certain clinical context are excluded from the "evidence base". The Cochrane's evaluative criteria
166 include principles of randomization, allocation concealment and double blinding in order to minimize or
167 eliminate bias completely. These designs are modeled on principles of testing pharmaceuticals, which is not
168 the best application for many therapeutic interventions. As an author of a Cochrane review, I think that it is
169 really important for us to engage with the evidence debate.

170

171 **LS:** In our discussion so far, we have yet to touch on the distinction between Music Therapy and Music
172 Medicine. Could you outline how those two approaches differ?

173

174 **WM:** Music Medicine involves interventions using music that have a clinical outcome in mind, but where the
175 outcome is not reliant on the relationship between the client and the person giving the intervention. That is, the
176 intervention does not rely on some type of human musical dialogue and relationship development (or process)
177 that is typical in a therapeutic interaction. These interventions are typically implemented by nurses, doctors
178 and even dentists. The interventionist could simply leave the music with the client. A good example of this is
179 the management of pre-operative pain and anxiety, where a patient is given recorded music to listen to. I
180 believe there is a role for non-complex music interventions such as these, where there is minimal risk to the
181 patient and can be delivered by a wide range of health professionals. Such interventions do not require training
182 in how to deliver the intervention, or in how to enhance the interpersonal interaction or analyze the patient's
183 responses. This contrasts with clinical scenarios that do require complex interventions. Some examples of
184 these might be psychological difficulties where the person has trouble in developing or maintaining
185 interpersonal relationships, due to Autism spectrum disorders, an attachment disorder, or is dealing with the
186 psychological trauma caused by bereavement, loss or abuse. These clinical needs demand a human element:
187 another person to work with the client in order to provide them with the experience of relearning to "relate".
188 These clinical needs demand very different musical and therapeutic interventions to simply playing a patient
189 recorded music.

190

191 **LS:** So in some cases, is music used as a framework to facilitate a more standard type of talking therapy?

192

193 **WM:** Relationship development, through the use of music, is certainly comparable to speaking therapies.
194 Music can be a useful medium to work on interpersonal issues for a number of reasons. Within a musical
195 interaction, you can sing “with” a person, not simply sing “at” or “to” one another; you improvise, listen,
196 attune and respond using imitation or reflection. With some populations it is more effective than
197 communicating with words, particularly for those who may find it difficult to speak or perhaps those who have
198 not yet acquired language or have lost language due to brain damage.

199

200 **LS:** I sometimes think that the skills and knowledge that music therapists have are not well understood, from
201 the perspective of the basic science researcher. For instance, at a recent talk I attended, the presenter who was
202 a non-clinician scientist, was asked whether the described intervention given to a particular clinical group was
203 administered by a music therapist or not. The response was ‘No, but the person delivering it was a competent
204 musician’.

205

206 **WM:** Yes, this is important to articulate. In some clinical settings, the assumption may be that a music
207 therapist is there to simply entertain the patient in order to lift their mood. In fact, music therapists are
208 professionals who have been trained to a high standard musically, but more importantly, they have been
209 trained to work with clinical populations and to use music in ways to address a wide range of social,
210 emotional, behavioral and physical needs. Most importantly, they are trained in attuning to other people,
211 musically and emotionally, whilst maintaining strong boundaries between themselves and the client.

212

213 Simply learning a protocol through reading a theoretical research paper and attempting to apply it within a
214 clinical setting presents many risks to the patient and the person doing the music protocol. When working with
215 clinical populations, unexpected difficulties can arise whereby an untrained person may not be able to manage
216 the situation, (e.g. extreme agitation, distress, physical self-harm), and interact with the patient safely. A
217 music therapist has skill and expertise to a recognized standard in assessing a situation and adapting a protocol
218 to a clinical situation.

219

220 **LS:** Perhaps one of the difficulties in understanding what music therapists do comes from the existence of
221 several different approaches and philosophies within the profession. The kind of Music Therapy that is
222 probably most familiar to neuroscientists is Neurologic Music Therapy (Thaut, 2005), but in music therapy
223 circles, many other ‘flavours’ are dominant and some of them seem to downplay functional goal-setting,
224 which to neuroscientists, can be difficult to appreciate - could you comment on that?

225

226 **WM:** I think this point you bring up is a really important issue. As with other professions (e.g. Psychology)
227 there are different theoretical models in music therapy that range from behavioral, to psychodynamic, to
228 music-centered, to humanistic and so on. Each approach has its own merits and some will be more suited to
229 certain contexts than others. However, the important thing is that the model of music therapy used is
230 appropriate to the patient’s needs, and the therapist can articulate the outcomes and rationale behind the
231 method they are using in ways that the patient, families and colleagues can understand.

232

233 **LS:** We’ve covered a lot of ground here, but I wonder if I can finish up by asking you where you see Music
234 Therapy making the biggest inroads going forward?

235

236 **WM:** I feel very excited about interdisciplinary collaborations such as that modeled by MANDARI, because
 237 these have big implications for both of our professions, and most importantly, for patient care.
 238 Interdisciplinary research with other clinical professions (e.g. nursing; medicine) is also growing and will
 239 improve research through accessing more participants who are suited to studies. Research that continues to
 240 explore music's impact on the brain with clinical populations is also a priority so that we can develop
 241 interventions that will have greatest impact, particularly when we consider Dementia and Stroke as the two
 242 largest and fastest growing populations in societies around the globe. We need to understand why and how
 243 music works and refine interventions. Tapping into populations for which we have no evidence base is also a
 244 priority, such as post-traumatic stress disorder, particularly those who have returned from military conflict and
 245 the devastated populations left after conflict or torture. Music Therapy's impact in this domain would be both
 246 from neurological/functional but would also address psychological trauma that cannot be explored easily using
 247 verbal interactions. The findings potentially would be relevant for a number of populations where
 248 psychological trauma is a major factor.

249

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