

1.8 Music and healing processes: Music therapy

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Introduction

Music has been used for healing purposes since ancient times. Healing rituals throughout human history have included music accompanying ceremonies and serving to signify important parts and events within these culturally diverse healing practices. The use of music as a part of healing continues today, including, specifically, music therapy. Music therapy (to be abbreviated "MT" in this chapter) is the systematic use of music and its elements by trained music therapists in an interactive therapeutic context to restore, maintain, and increase emotional, physical, and mental health. Modern music therapy "...uses music and its elements as an intervention in medical, educational, and everyday environments with individuals, groups, families, or communities who seek to optimize their quality of life and improve their physical, social, communicative, emotional, intellectual, and spiritual health and wellbeing." (WFMT, 2011). We differentiate MT approaches in which we actively make music (*Active MT*), such as improvising, singing, or composing together from approaches in which we focus on listening to music (*Receptive MT*). Both methods utilize music as "an art beyond words" for healing purposes (Bunt & Stige, 2014). This chapter will focus on current research into musical communication in clinical improvisation as a core ingredient of human interaction in music therapy practice. A vital aspect of this practice is the recognition of *kairological moments*, i.e. important episodes of the music therapy process that indicate and promote change in therapy. How to document, recognize, and analyze such moments is one of the major challenges in understanding why music seems to work in healing processes.

Basic categories of music therapy

The 1999 triannual World Congress of Music Therapy in Washington DC, focused on five major models of music therapy: 1. Analytical MT, 2. Benenzon MT, 3. Guided Imagery in Music (GIM), 4. Nordoff/Robbins MT, and 5. Behavioral MT. The first three approaches to MT may be labeled psychodynamic, in contrast to the final two approaches, which may be called music-centered. In psychodynamic approaches music is used *in* therapy to evoke psychic material, whereby in music-centered approaches music is used *as* therapy and symbolic interpretations and verbalization are avoided (Bruscia, 1987). The first two models, Analytical and Benenzon, adhere to a psychodynamic model, in which music is used *in* therapy (including psychotherapy) and verbalizations, and observed psychic processes and symbolizations are interpreted from a variety of psychotherapeutic--mainly psychoanalytic--frameworks, such as those of Freud, Jung, Adler, Frankl, or Perls (Bruscia, 1998; Bunt & Stige, 2014; De Backer & Sutton, 2014; Erkkilä, Ala-Ruona, Punkanen, & Fachner, 2012). The first two models make use of musical improvisation and verbal therapy; in contrast, Guided Imagery in Music focuses on music listening and psychotherapeutic interaction based on the imagery evoked during and verbalized along with the listening process (Grocke, 2009). The music-centered Nordoff/Robbins approach (Nordoff & Robbins, 2007) sees the act of making and gradually improving music *as* therapy, compared to the Behavioral MT model, which is based on the idea that music listening can be used as a medicine and that we can measure the effect of music with distinct bodily responses, independent of psychotherapeutic frameworks (Spintge & Droh, 1992).

Healing settings

MT is a discipline which has evolved out of utilizing music for therapeutic purposes and is aimed at the needs of the patient and his/her specific illness, behavior, personality and biography. Doing MT is based on an interaction between a patient and a therapist. As with any other therapy, the reason for MT is that people need and seek help from a qualified person (WFMT, 2011). This relationship of a "healing contract" distinguishes clinical improvisation, singing, moving and imagery related to music listening from other situations involving music making and listening (Brown & Pavlicevic, 1996; De Backer & Sutton,

2014). MT happens at a specified place in a healing setting--for example a hospital, a hospice, a private practice, a special school, or even a prison--and the purpose of the meeting will be connected to a shared experience of listening to or making music.

Since its beginnings, MT has been influenced by other disciplines like medicine, psychology, pedagogics, anthropology, philosophy, and the sciences of music. In parts of the theoretical discourse in MT, its roots are traced back to shamanic healing practices (Hanser, 2009), at the core of which are a variety of techniques such as drumming, dance, and music ; these are used to alter consciousness, in order to change the focus of attention and cognition (Fachner, 2011). Techniques that alter the focus of attention offer a way to "empty" the contents of memory, allowing new information to enter. Such processes are safely accompanied and guided by a therapist, who may, for example, help a patient to focus on the imagery that may arise when listening to music together and in analyzing such associations and images, as practiced in the Bonny Method of Guided Imagery in Music (Grocke, 2009).

The practice of MT with a client is always unique for each patient's situation. This might explain why various models based on single case study designs have been employed in MT research in order to contextualize the complex and situated healing phenomena which arise. Similarly, case studies with multiple baselines across differing conditions and behaviours--for example when analyzing different individual responses to MT in a class of autistic children (Kern & Aldridge, 2006)--and mixed methods utilizing qualitative and quantitative research measures have dominated MT research (Wheeler & Murphy, 2016).

Over the last few decades, a growing number of studies have provided empirical and scientific evidence for the positive effects of MT, transforming it into a more evidence-based treatment. With the implementation of evidence-based research, the idea of a goal-driven and manual-based practice has entered the discussion on MT approaches. For example, treatments that sequence musical activities for

training to overcome specific physical limitations due to stroke are now being based on neurological research outcomes (Street, Magee, Odell-Miller, Bateman, & Fachner, 2015). The Cochrane Library of Systematic Reviews (cochranelibrary.com) has published promising reviews of music therapy as applied to autism spectrum disorder, depression, schizophrenia, and acquired brain injury; as of this writing, 920 MT controlled trial study results are currently registered. Among these, we see that studies utilizing randomized controlled trials report reductions of depression and anxiety (Erkkilä et al., 2011) and also indicate reductions of dementia symptoms (Ridder, Stige, Qvale, & Gold, 2013; Schall, Haberstroh, & Pantel, 2015). Various systematic reviews indicate MT benefits for end-of-life patients, cancer, coronary heart disease, pain, serious mental disorders, pediatric clients, asthma, premature infants, and several reports on dementia (see Bradt, 2016, pp. 628-629).

Evolving from such empirical evidence, one approach to understanding the action mechanism which underlies effective MT is to take a detailed look at cases in which change occurred, and how that change evolved in specific moments and timeframes that were important and meaningful in the overall development of the therapy sessions (Amir, 1996; Fachner, 2014).

Healing processes - therapeia, symbols and consciousness

Music therapists use music to with and alongside their patients and they use the temporal nature of music to accompany and work with the emotions, imagery and thoughts evoked by both clients and therapists when doing music together. They are working with aesthetics, and with art as they work with patients in processes of healing as therapists, in the original Greek sense of the word. The term "therapy," as Plato used it, is "therapeia" (θεραπεία), meaning "to accompany patients on their way" into, through, and out of the unknown of their illnesses (Fachner, 2014).

This original connotation stresses a temporal understanding of the process of doing therapy with a guiding, nurturing and serving therapist ("therapon" - θεράπων). Illness is a "journey into the unknown" (Aldridge, 1990, p. 178) that

contains a patient's continuous fear of loss of reality, whereby symptoms signify the struggle for expression of the unknown, inner reality; art has the mission to "confront us with something we have not realized before" (ibid) and therefore becomes an indicative means of objectification of subjective reality. Music or art in general not only stimulates feelings but facilitates expression of the unknown, but what may be heard in the MT process is not necessarily a "message *from* the subconscious" (ibid. p 181).

Joint clinical improvisation produces audible information about the unknown and allows us to reveal symbols, images and thoughts of the client's inner world with a therapist accompanying and sharing the client's journey into the unknown. However, how to interpret and handle what happens depends on the MT approach of the therapist. Music-centered approaches do not necessarily refer to a theoretical system of the psyche (such as those of Freud or Jung), but focus on the development of the co-created musical material as the driving force of healing. Contrastingly, psychodynamic approaches are convinced that each therapeutic interaction will sooner or later face the interactional dynamics and patterns that were learned in the child-parent interaction and that playing is connected to the state of being a child. Thus, some MT theorists describe the clients' experiences in improvisation as *proto-symbolic* (De Backer & Sutton 2014), referring to Winnicott's (1968) ideas about transitional space and transitional object when interpreting certain musical phenomena – such as the appearance of a melody in improvisation – as not yet being a symbol as such, but a symbol in pre-state.

"When considering clinical improvisation from psychoanalytic perspective, its role is to activate the symbolic process, and let the improviser act creatively on the domain of non-verbal experiences, i.e. on pre-conscious level, and thus bring out primary process orientated material to be dealt with verbally" (Erkkilä et al., 2012, p. 416).

Change processes, health beliefs and meaning

Bruscia (1998) defines clinical improvising in MT as "playing around with sounds until they form whatever patterns, shapes, or textures one wants them to

have, or until they mean whatever one wants them to mean" (p. 5). In healing processes, it is of the utmost importance to consider the patient's individual health beliefs; such individual opinions on the symbolic significance of illness contribute to the cognitive management of illness and therapy. Meaning is created when we relate observation, statements or behaviour to an individual continually developing a "framework of fundamentals" (Aldridge, 1990, p. 179). In the therapy process, a patient's framework of fundamentals, representing the patient's limitations, experiences, cognition and related health beliefs, are addressed and updated when his internal unknown elements are made known through the objectivation of a jointly produced "work of art" (Aldridge 1990, p. 180). In an artistically oriented therapy process, the act of creation transforms the negative sign of the illness into a socially positive sign as a potential for healing. This change in meaning – specifically if such meanings symbolize something personal or social – appears to be a basic element of healing processes.

Such a change in meaning may then become an initial moment of change in illness. For example, if a patient suffering from spasticity experiences that his involuntary body movements can make rhythmical sense in clinical improvisation, and that in this specific context an ability to create and shape the music arises which can be directed with the patient's own ideas and intentions, then this will result in a positive body experience and a different recognition of the patient's abilities, which may transfer to other areas. Here, consciousness is and becomes a creative act, an expression of "I am able" as an important part of intentionality, which is made audible in therapy. If illness in general is accompanied by loss of individual performance, then it is a reflexive limitation of consciousness that leads to limitations of individual perspective regarding possible action patterns. This suggests that consciousness is a creative act in itself and depends on action, intention, reflection and the experience of the conscious individual.

"Music and consciousness are things we do. [...] Achieving consciousness, from the Latin *con* (with) and *scire* (to know), is the central activity of human knowledge. At the heart of the word is a concept of mutuality, knowing with

others. Our consciousness is a mutual activity; it is performed.” (Aldridge & Fachner, 2006, p. 10)

***Kairos* and situated cognition**

In the fairy tales of *1001 Nights* the uniqueness of the moment that changes the whole story is the focus of most storylines. Very often, the story describes a specific situation, a specific *plot* at a moment in which the protagonist is lucky to grab a chance to change his or her fortune. The Greek term '*kairos*,' meaning the 'right moment,' refers also to the ability to seize the moment, to recognize the opportunity to act and decide on something, based on an individual's experiences in the "here and now" (Aldridge, 1996, p. 37). *Kairos* seems to be a more appropriate time concept for music therapy than time as *Chronos*, or "clock" time. Rather than looking at the chronological order of parts in a piece of music, as successive elements of the piece as a whole, the *kairos*-focus is on situational relationship to the music and how the perceived musical elements interact with the client's experience of the music in an interactive setting of therapy.

“Communication in music therapy needs to be seen through the lens of “situated cognition,” in which meaning, knowing and learning are generated in the situation of doing something bound to a [temporal] social, cultural and physical context (Smith & Semin, 2004). Communication in music therapy is thus dependent on contextual developments and not on a plan made like a scene-play; the music is temporal and emotions signifying meaning are evoked through the interplay of music and the people who do the music” (Fachner 2014, 792/3).

Time processes are related to the events and the personal meanings and experience of these events in the music, rather than the music's inherent logic. In order to apply quantitative methods in researching the time-course of changes brought about through music therapy, one recent music therapy study used time series analysis for the study of dementia treatment (Schall, Haberstroh, & Pantel, 2015). Analyzing excerpts (30 sec) of nine clients' session videos ratings, the "trend types" (p. 117) of the time series data showed statistically significant positive effects, suggesting that effects of music therapy are "situational rather than being cumulative" (p. 118).

Focus point: Important moments in therapy and improvisation

The core ingredient of an active MT session is the interaction between a patient and a therapist, often engaged in dyadic improvisation. Regarding the action mechanisms of MT, one research focus is on the (micro)-analysis of pivotal MT episodes (Wosch & Wigram, 2007), i.e. important moments signifying turning points during the time-course of MT, in particular in improvisation. Analysis of moment-to-moment interactions have been the subject of many MT case studies and different studies have expressed this variously, describing "meaningful moments" (Amir, 1996), "pivotal moments" (Grocke, 1999) "significant moments" (Trondalen, 2005), or "present moments" (Ansdell, Davidson, Magee, Meehan, & Procter, 2010).

However, the basic feature such important moments have in common is that they are chosen time frames from the MT sessions in which change--in the sense of a turning point in therapy development--was recognised from the therapist and from the client (Fachner, 2014). This may be either in the situation whilst doing MT, or in retrospect when indexing the events in the session. Nevertheless, to understand the process of MT properly, one has to follow it through an extended and sometimes gradual series of changes; to focus only on highlights or significant moments will not suffice to understand the process and its development (Nordoff & Robbins, 2007, pp. xxii-xxiv). For example, a client responded to certain melodic motifs that have been used in several sessions--but in one session when these motifs were fitting together to become a song, the moment in which the song evolved became indicative for change.

Further, such moments may represent "good musical practice" in *clinical improvisation*--which is not necessarily the same as in art improvisation--and indicate moments of personal change, possibly linked to symptom decrease (Erkkilä, 2014). Good musical practice may be an ingredient of important moments in clinical improvisation but this is not necessarily the case; for example, when improvising with a depressed musician good art improvisation may happen very often during MT and thus, may not be of significance for the therapeutic process.

In [art improvisation], “supporting” is equivalent to being “in background musically,” and “leading” is equivalent to being “in foreground,” where leading has the stronger focus musically. In [clinical improvisation], to think of supporting as only meaning background is not enough ... [supporting] might require initiative, guiding, helping out - the equivalent to leading in [art improvisation] ... [Furthermore a reversal of musical roles in clinical improvisation, whilst acceptable in art improvisation] would not be considered good therapeutic practice, maybe implying the therapist inserting her own issues, thus clouding her receptivity to the client’s needs (Brown & Palicevic, 1996, p. 403 in Darnley-Smith, 2014, p. 64)

Capturing and analyzing important moments

MT consists of interacting in or about music; this happens together with a therapist using a variety of musical instruments or listening and recording devices. Audiovisual recording devices are mostly used to capture the therapy sessions in order to revisit parts of the sessions and to analyze the musical, verbal, or gestural interactions. Magee (2014) offers a broad overview on how we can use music technology as an aid in therapy as well as to document and analyze the sessions. Audiovisual and MIDI data from clinical improvisation can be used to analyze dyadic processes in important therapeutic moments. The MATLAB based Music Therapy Toolbox (Erkkila 2014) allows a researcher to describe the pitch, density, velocity (loudness), and other acoustic features of selected musical parts using techniques of music information retrieval, and also allows a researcher to describe degrees of synchronization in dyadic playing. *Microanalysis* focuses on selected segments in verbal, bodily and musical interaction. Microanalytic techniques, such as the pioneering frame-by-frame analysis to show the interactive nature of bodies synchronizing to speech (Condon & Sander, 1974) have been applied often in music therapy (Wosch & Wigram, 2007). Microanalysis is a detailed analysis of moments, events, and episodes within a session to document the “moment-by moment experienced change” (Wosch & Wigram, 2007, p. 22). Wosch and Wigram’s book on microanalysis describes several studies utilizing this approach to describe the relationship between musical features and clinical outcomes. Video analysis methods and motion capture methods may also be utilized to describe moment-

to-moment interactions and how gestures and movements synchronize (Wosch & Wigram 2007, Street et al 2015).

Music therapists may want to contextualize brain activity during important moments in MT sessions, in order to see how brains process shared information, but attempts to capture practical MT in a laboratory setting often impair the authenticity of the situation (Fachner & Stegemann, 2013). Body movement, especially of the head, is restricted and subjects have to adapt to the brain recording machine. Thus, the recording instruments must be adjusted as closely as possible to everyday practice in order to generate context-sensitive authentic data. **Recent** developments in wireless EEG hardware have made it possible to use portable EEG units to record data during music performance, and so forth. Wireless data transmission and wearability is an important advancement, as most stationary EEG recording systems require one to sit quietly. When studying brain activity during improvisation in music therapy, where patients should be moving freely however, the methods employed in sports and movement sciences need to be considered. There is no current *in situ* neurophysiological study of active MT and thus, the underlying neurodynamics of clinical improvisation remain unknown although recent hyperscanning research (involving scanning 2 or more brains at once in order to study brain-to-brain-coupling) offers a paradigm to simultaneously study interactive brain processes in social contexts (Fachner, 2014).

Investigating musical communication in important moments

To understand musical communication (see chapter 5.3 in this volume) synchronization and entrainment, as indicators of enhanced musical communication, have been the focus of several investigations (Hari, Himberg, Nummenmaa, Hämäläinen, & Parkkonen, 2013). One means of acquiring an understanding of what happens when individuals create music together is to analyse electrophysiologically the synchronization patterns of brain waves and heart beat during interactive music making. Such analysis of synchronous brain activity can be realized with two (or more) synchronized machines recording MEG or EEG and/or two corresponding Electrocardiographic (ECG) recording

systems. We now turn to some uses of such methods to better understand the workings of MT.

Neugebauer & Aldridge (1998) studied cardiac synchronization between two musicians improvising in a MT context. Before analyzing the physiological data of the participants, an index of therapeutic events which took place during the session was created. This evaluation was done in keeping with standards of good practice in Nordoff-Robbins MT: "criteria for the judgment of musical relevance were concerned either with communicative interaction and/or musical events such as moments of musical interrelation, initiatives for musical change, mutual changes in the playing, changes of tempo, dynamic and mood" (Neugebauer & Aldridge 1998, p. 47). The therapeutic events identified in this manner were compared to the corresponding events identified on the timeline of the ECG. An analysis of participants' heart rate patterns revealed a convergence of activity within dialogical events represented as parallel or opposite heart rates and simultaneous or alternating peaks indicating action-specific synchrony patterns of coordinated activity, indicating how the musical dialogue was accompanied by converging HR measures.

Pioneering music performance research examining two people playing a short guitar melody in unison (Lindenberger, Li, Gruber, & Muller, 2009) or four people playing saxophone (C. Babiloni et al., 2011) has shown how physiological functions synchronize in a coherent manner during the production of a social product--a piece of music performed together. For the guitarists this was observed "during the periods of (i) preparatory metronome tempo setting and (ii) coordinated play onset" (Lindenberger et al., 2009, p. 1). Both were adhering to a short series of metronome clicks (i) and a start signal (ii) before playing a melody in unison (see video supplement of Lindenberger et al 2009). Playing the melody together led to synchronous activity in frontal and central brain areas, indicating time-locked synchronization of planning and the creation of a shared activity. When playing non-unison melodies, findings were consistent with Lindenberger et al. (2009) but the authors noticed increasing phase synchronization between the brains during more challenging musical phrases

that required increased coordination between the guitarists (Sänger, Müller, & Lindenberger, 2012), Another study described theta and delta brain frequency connections (oscillatory coupling) in dyadic improvisation between guitarists (Müller, Sänger, & Lindenberger, 2013).

Bablioni et al (2011) recorded EEG data from musicians while playing together. Their findings indicate power-related differences in alpha frequency amplitudes, which were localised through sLORETA (Low resolution electromagnetic tomography) source estimation. Studying the differences between performing a piece in a more improvised and in a composed fashion, Dolan and colleagues (2013) reported different responses from performers and listeners regarding activation of cortical areas. Differences between pre-composed and improvisation conditions were located via sLORETA in Brodman Area 9 (dorso-lateral prefrontal cortex) within the alpha range indicating less involvement of sustained attention, working memory in the improvised condition implying a different brain working mode during improvisation (indicating less mental workload) then during playing the pre-composed condition (Dolan, Sloboda, Jensen, & Cruts, 2013).

Future directions

The previously-mentioned "hyperscanning" method in the field of social neuroscience tries to trace how brain-to-brain coupling functions in social interaction (F. Babiloni & Astolfi, 2014). How brain-to-brain coupling aligns with body posture and movement (Hari, et al., 2013), how the temporal dynamics of musical emotions create moments of similar brain activity in listeners (Trost, Frühholz, Cochrane, Cojan, & Vuilleumier, 2015), and how brain processes between music listeners synchronize when listening to longer pieces of music are topics of vital interest in the field of MT (Fachner, 2014; Fachner & Stegemann, 2013). Neugebauer & Aldridge's 1998 study was based on clinical scenarios as they happen in everyday clinical situations. However, determining how much of the brain coupling identified so far is applicable to clinical improvisation requires further experimental investigation.

Future studies may apply such physiological measurements and biomarkers for investigating more closely the workings of MT. Tracking therapy processes utilizing wearable measuring devices will allow capturing the *in situ* physiological signatures of important moments in therapy by integrating biomarkers into our clinical settings. Dual *in situ* recordings of therapist-client dyads might be submitted to a complex hyperscanning analysis based on a therapist's usual post-session analysis. Following selection (by the therapist or others) of important therapeutic moments over the time course of MT sessions, we may seek to analyze the physiological interplay of a micro-analytic event structure (see Wosch & Wigram, 2007). Such case studies may help to identify how brains synchronize and bodies entrain in music therapy processes., and help to explain how MT works and may allow prediction of specific disease treatment response and effectiveness.

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