PART TWO: MUSIC THERAPY IN DEMENTIA CARE AND NEURO-REHABILITATION

Roundtable presenters
Ridder, Odell-Miller, Schmid

Discussion group members
Beck, Fachner, Dileo

Moderator: Stige

A reflexive introduction

The many futures of music therapy in dementia care and neuro-rehabilitation

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With the radical shifts in the demography of most societies in the world today, debates emerge about the needs and rights of the growing number of people living with dementia. Increasingly, music therapy is part of these debates, and its relevance within neuro-rehabilitation seems to be developing as well. When Aalborg University held a symposium titled *'Music therapy: A profession for the future'* on 15th April 2016, the fields of dementia care and neuro-rehabilitation naturally were on the agenda.

In the symposium in Aalborg, three music therapy specialists presented their visions about the questions '*Why music?'*, *and 'Why and when is a music therapist needed?'*. These are documented here in three lecture papers by Hanne Mette Ridder (Denmark), Helen Odell-Miller (United Kingdom), and Wolfgang Schmid (Norway). The roundtable discussion following the presentations at the symposium had input from Bolette Daniels Beck (Denmark), Jörg Fachner (United Kingdom), and Cheryl Dileo (USA). A plenary discussion followed after that. The present reflexive paper introduces lecture papers that subsequently have been developed by Ridder, Odell-Miller, and Schmid, and also a reflection paper from another perspective by Beck. In addition, the introduction is inspired by the verbal discussions at the symposium in Aalborg.

Three lecture papers and a further reflection paper

In her lecture paper on music and music therapy in dementia care, Hanne Mette Ridder (2017) outlines several responses to the question of why music for persons with dementia. Some of these are medical

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in nature, informed by new knowledge on the brain mechanisms supporting the processing of musical information. Ridder supplements her presentation of this with references to qualitative research exploring the experiences of persons living with dementia, as well as the experiences of families and staff. The medical model does not suffice in responding to this question; indeed Ridder argues that there is also a need for a psychosocial model of music in dementia. This appraisal informs her response to the question of why and when a music therapist is needed; she strongly argues in favour of cross-professional work and a broad and flexible role for the music therapist, including practices of knowledge exchange and collaborative knowledge mobilisation.

Helen Odell-Miller (2017) also writes about music therapy in dementia care, and she argues that the music therapist's unique role in dementia care is where specific needs for people with dementia, including their carers, cannot be met by others. In qualifying the claim, she offers as an example how music therapists can support and enhance non-verbal communication with people with behavioural and psychological disturbances in the advanced stages of dementia. She then outlines research, theory and clinical experiences that support this appraisal. Similar to Ridder, Odell-Miller underlines the value of working with people in addition to the patients themselves, such as families and carers, who might need supervision and support. Odell-Miller relates the prioritisation of tasks to the various stages of dementia.

Wolfgang Schmid's (2017) lecture paper focuses on improvisational music therapy in neuro-rehabilitation. After a brief overview of the literature that documents the increased interest in music therapy and neuro-rehabilitation, he outlines an argument that includes and goes beyond the knowledge produced by neurology and neuroscience. The benefits of music therapy must be explored musically in relation to each person's needs and possibilities in context, Schmid argues. He also argues that we should not only take interest in why and when music therapists are needed. We should also invert such questions and examine the limitations of the profession and possible contra-indications of music.

In her reflection paper, Bolette Daniels Beck (2017) concentrates on music therapy for prevention of stress and mild cognitive impairment. Beck examines literature on the relationship between the amount of life stress and the onset of dementia or mild cognitive impairment. After reviewing the literature, she concludes that there are many benefits of music listening and music engagement for prevention of stress and mild cognitive impairment. She therefore argues that people's possibilities for active engagement with music is a public health issue and that music activities should be widely supported in schools, institutions, hospitals and local communities.

Comments and reflections

The three lecture papers and the further reflection paper presented above were – as already mentioned – part of a symposium where Jörg Fachner and Cheryl Dileo also participated in the roundtable discussion, followed by a plenary discussion. We could consider this as part of ongoing reflections on the future of the discipline and profession of music therapy (Dileo 2016). In the discussions, some highlighted neuroscientific and medical knowledge supporting music therapy interventions, others argued for a more psychosocial and sociocultural approach to the study and practice of music therapy.

Jörg Fachner, who previously has written several texts on how musical responses can be measured (e.g. Fachner 2016), contributed in the discussions with a commentary where he argued for the importance of using biomarkers to support case studies (see also Ridder & Fachner 2016). Fachner argued that it is important to use an objective measure that can be contrasted to the subjective data that music therapists often collect. Biodata cannot be manipulated while recording and therefore have many strengths, Fachner argued, although he admitted that interpretation and application is often very difficult. As a comment on how research methods can be improved, he talked about the importance of using technology that is as non-intrusive as possible, and he reflected on the possibility of a future where music therapists are much more proficient than today in integrating mobile brain-body measurement tools into the lifeworld of the clients and our music therapy practices.

The many futures of music therapy

Obviously, there are many futures of music therapy. The papers and commentaries referred to above not only refer to different aspects of our future, they also reflect different visions of it. This should come as no surprise if one considers the multiple histories of music therapy, informed by a number of diverse theoretical perspectives, such as medical, behavioural, psychodynamic, humanistic, transpersonal, culture-centred, and music-centred perspectives (Bunt & Stige 2014). To develop agreement about what perspectives could best serve the future of the discipline and profession would hardly be a realistic ambition for a symposium, and I did not observe any attempts in that direction either.

At the same time, the discussions did go beyond sharing recent developments in theory, research and practice. Several of the contributions highlighted a personalised and contextualised approach to music therapy where personhood as well as the social context of practice, were taken into consideration. Perhaps – in the midst of the multiple futures of the profession – there will be possibilities for shared concerns about the need to tailor practices to person, place and time. This is hardly a new idea in music therapy, but new and broader ways of practising seem to be developing; for instance, when music therapists prioritise to work with families and staff, to care for the sound environment of homes and institutions, and to promote patients' rights as citizens (Stige & Ridder 2016).

Obviously, such visions do not invalidate the medical and neuroscientific knowledge on music, and the question remains as to if and how it will be feasible to integrate and/or flexibly apply several theoretical perspectives in the development of profession and practice. The future of music therapy will not only reflect developments in theory, research and practice, but values-based prioritisations of our limited time and resources as well. Our capacity to listen will be key.

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Lecture 1

Music therapy in dementia care and neuro-rehabilitation

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A video clip posted by the Los Angeles Times shows a woman lying in a hospital bed (Simmons 2013). Beside her bed sits a young nurse. He is holding her hand in both of his – and he is singing for her. She looks at him, her lips are moving with some of the words and a smile comes to her face. Then she turns her head away and wipes away a tear, clearly moved by his singing.

The patient, Norma Laskose, who is 89 years old and suffers from pneumonia and lung cancer, explains that "When he looks at you, you know that he is singing *to* you. It just pierces my heart". She is not a dementia patient but the video shows how this "singing nurse" is offering a special method to keep the patients' minds off their pain. Nurse Jared Axen of Valencia Hospital in California sings to soothe his patients. His talent was discovered at the hospital by chance (Simmons 2013, para 4). Through casual singing when he was working, Axen realised the positive effect of singing and understood that this was a unique way to connect with his patients. For his important work, Axen was awarded Nurse of The Year in 2012, and also received The Southern California Hospital Hero Award in the same year. Similarly to California, nurses and health professionals in many other countries have described how they use singing or music as a way to contact patients and to create moments of powerful, passionate and intense contact. This awareness to use music in the care of patients seems to have increased in recent years which is exemplified through websites, television broadcasts and YouTube clips from, for example, Australia[1], Norway[2], Sweden[3] and the USA[4,5].

Why music for persons with dementia?

In line with the increasing interest in applying music in medical care, the healing power of music has been recently highlighted in journals such as the *Scientific American* (Thompson & Schlaug 2015) and *Musicae Scientiae* (Croom 2015). In an article published in the journal *Nature*, the "surprising preservation of musical memory" in persons with Alzheimer's Disease is explained (Jacobsen et al. 2015: 2439). In discussing these findings of musical memory in relation to music emotion and auditory processing, Clark and Warren (2015) argue that we urgently need to re-evaluate what we know about dementia by integrating new understandings of how brain mechanisms support musical information processing. This may bring us new and powerful methods in treatment and care.

> "The conundrum of Alzheimer's disease may finally be solved only once we understand its more subtle and least tractable effects, which are frequently the effects that matter most to our patients. Music may be a means to achieving this end" (Clark & Warren 2015: 2125).

Indeed, Alzheimer's disease and dementia generally present us with a conundrum. In numbers alone, we are challenged with close to eight million new cases each year, resulting in almost 50 million people living with symptoms of dementia (WHO 2015). Dementia is a syndrome leading to neurodegeneration increasingly affecting the person's thinking, behaviour, memory and activities of daily living. Consequently, dementia is one of the major causes of disability and dependency among older people and therefore has great impact on

[1] ABCnet 2016: http://www.abc.net.au/catalyst/stories/4421003.htm

[2] NRK 2014: http://www.nrk.no/livsstil/nrk-helene_-_-noe-av-det-sterkeste-jeg-har-opplevd-1.11990203

[3] Wahlgren 2016: http://singingnurse.se/

[4] Trailer, Alive Inside: https://www.youtube.com/watch?v=IaB5Egej0TQ

[5] SparrowTV 2016: http://sparrowtv.org/videos/sparrows-singing-nurse-linda-porter/#.WBDymKKfbvN

everyday life for the person and also for the family, for health professionals and for society as a whole (WHO 2015).

The meaning and value of music for people with dementia was explored in a qualitative study by McDermott, Orrell and Ridder (2014) with a focus on how music is experienced from the perspective of people with dementia themselves, and also from the perspectives of families, care home staff and music therapists. This led to suggesting that music taps into an individual's sense of self in relation to personal preferences and life history, and goes beyond the idea of music as a tool to fix behavioural problems (McDermott et al. 2014). Music is understood to be part of a wider appreciation of life which may be explained in the paper *'Psychosocial Model of Music in Dementia'* (McDermott et al. 2014). This model integrates an understanding of music experienced by people with dementia with regard to 'who you are' and the 'here and now' and with musical and interpersonal 'connectedness'.

Why and when a music therapist?

Music therapists are trained to tailor the use of music to the aims of each individual client and to meet psychosocial needs at various levels. In music therapy sessions, the therapist is aware of how to compensate for neurodegeneration in the person with dementia by applying a variety of positive interactions (Kitwood 1997). These interactions may encompass music in order to:

1. catch attention and create a safe setting;
2. regulate arousal level to a point of self-regulation;
3. engage in social communication in order to fulfil psychosocial needs (Ridder 2003, 2011; Ridder & Wheeler 2015).

The above clinical approach was applied in two recent randomised controlled trials that showed the positive effect of music therapy on neuropsychiatric symptoms in people with dementia (Hsu et al. 2015; Ridder, Stige, Qvale & Gold 2013). However, the latest updated Cochrane Review on music therapy for people with dementia (Vink, Bruinsma Manon & Scholten Rob 2011) could only include ten studies, all of which did not satisfy the quality to be included in a meta-review. It is therefore not (yet) possible to claim that there is evidence for music therapy; however, a number of review studies on non-pharmacological interventions suggest a positive effect of music or music therapy on agitation (Hulme et al. 2010; Kverno, Black, Nolan & Rabins 2009; Livingston et al. 2014; McDermott, Crellin, Ridder & Orrell 2013b; Spiro 2010; Ueda, Suzukamo, Sato & Izumi 2013; Wall & Duffy 2010). Among these, the health technology assessment by Livingston et al. (2014) included 160 studies of sensory, psychological and behavioural interventions for managing agitation in older adults with dementia. From this vast material the researchers concluded that the following five interventions reduce agitation in care home dementia residents: person-centred care, communication skills and Dementia Care Mapping (all with supervision) as well as sensory therapy activities and structured music therapies. Furthermore, the researchers added that future interventions should change care home culture through staff training.

Discussion: interdisciplinarity and knowledge mobilisation

Music and singing is increasingly used in healthcare and for people with dementia – with good results – although the evidence of the effect of music therapy in dementia care is not confirmed in a Cochrane review. All health professionals who have the courage to explore non-pharmacological or psychosocial approaches to meet their patients' needs should, like Axen, be rewarded for their innovative approach. However, we can do better than leaving it to individual health professionals to develop such approaches by coincidence. Music therapists are trained to explore the application of music for the needs of individual persons. By being used as consultants at hospitals or nursing homes, music therapists can inspire, guide or teach health professionals or caregivers in a more systematic way, providing them with specific methods and techniques for the use of music.

In more complex cases, the person with dementia should be referred to music therapy treatment. As soon as it is appropriate, however, the music therapist should work together with the team around the respective person in order to share the knowledge gained in the therapy to help them make use of this in daily care and activities. This interdisciplinary approach to dementia care will increase knowledge mobilisation and knowledge

sharing, and pave the way for new learning for all involved, not least for the person with dementia. In this way music is integrated in the interaction between:

- ❑ person with dementia and music therapist;
- ❑ person with dementia and caregiver;
- ❑ person with dementia and the culture of care.

In this way we may distinguish between direct and indirect music therapy practice (Bunt & Stige 2014; Sandve & Enge 2015). In some events change may only occur through a direct therapeutic interaction. This does not make it less important, however, for the music therapist to pull back when the time is right and to leave his or her place in the interaction to the caregiver (either professional or a relative). The goal is to repair and strengthen the interaction between the person with dementia and the caregiver in order to influence the culture of care in the most positive way.

Following this, direct music therapy practice will consist of:

1. music therapy treatment based on referral, assessment and documented work, carried out by credentialed music therapists;

Expert knowledge integrating theory, practice and research – and the indirect music therapy practice will consist of:

2. knowledge exchange between the music therapist, person with dementia and caregivers;
3. knowledge mobilisation where the music therapist shares his/her expert knowledge – e.g. by teaching and supervising;
4. the music therapist's initiation, coordination and/or supervision of music activities provided by caregivers or community musicians.

Conclusion

The common goal for the dementia field is to advance and develop the culture of care. The music therapist may engage directly with the person with dementia through a music therapeutic intervention, or may assist other healthcare professionals, relatives or musicians in providing musical activities to build a relationship with the person with dementia, and on the terms of each person with dementia. It is complicated to interact through mutual understanding with persons who are difficult to engage due to neurodegeneration, but if this is done with insight and knowledge we might see important and beneficial 'side effects', such as increased quality of life, less agitation and restraints, and a reduction in psychotropic medication. Music therapists, who play a role in staff training and supervision, and not only in direct music therapy practice, bring new important dimensions to how music therapy discipline is understood and how it is integrated in interdisciplinary work.

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Lecture 2

Music therapy in dementia care and neuro-rehabilitation

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In this short lecture paper, the unique specific interventions of a music therapist in the field of dementia will be discussed within the context of clinical practice, research and education. This is a crucial topic because in 2016 approximately 55.4 million people were reported to be living with dementia worldwide. This is estimated to increase to 75.6 million in 2030, and 135.5 million in 2050. This results in an increased demand for long-term care in which effective management of symptoms is a major issue.

Clinical practice

The music therapist's unique role in dementia care is where specific needs for people with dementia, including their carers, cannot be met by others. In advanced stages of dementia, for example, cognitive decline leads to behavioural and psychological disturbance, and also confusion. Non-verbal communication through musical interaction is crucial at this stage, using improvised music where the music therapist supports, validates, recognises and musically develops the person's musical expression with them.

Behavioural and Psychological Symptoms of Dementia (BPSD) such as agitation, depression, apathy and anxiety are reported to affect approximately 80% of people with dementia living in care homes. In the dementia care environment, the music therapist is also needed to supervise others using music in everyday care which improves their communication and wellbeing (Hsu, Flowerdew, Parker, Fachner & Odell-Miller 2015).

Music therapy in this context is the systematic application of music within a therapeutic context for

therapeutic purpose, drawing upon live and receptive possibilities of music. This could include free improvisation, structured or unstructured. Individual and group sessions also draw upon composed or pre-composed music such as songs or songwriting, or receptive techniques involving listening to music. Thus the unique significance and function of the following qualities and potential for music in music therapy for people with dementia is important:

1. non-verbal possibilities;
2. use of all the senses;
3. artistic spontaneity and musical narrative;
4. physical, intellectual and emotional needs (music therapy does not always require conscious thought for the patient).

Stern's concept of synchrony is important as a theoretical model here, as Malloch and Trevarthen emphasise:

> "[…] there would be no way for me to sympathize with another person's intentions and feelings if we could not share the rhythms of this self-synchrony to establish inter-synchrony" (Malloch & Trevarthen 2009: 77).

When the person is in a state of self-synchrony, opportunities to establish inter-synchrony are possible (Malloch & Trevarthen 2009).

Cueing and social communication are impaired for a person in late-stage dementia. Through using live interactive musical improvisation, the music therapist can frame a safe environment with 'neuro-ception' and acoustic cueing. Such conditions are needed for the person with dementia to engage in social communication.

This is demonstrated by music therapy examples from M, a musician with early onset dementia (Odell-Miller 2002). In the third year of individual music therapy, held weekly in his home, M needed help with daily living skills. His speech was often confused, agitated, unintelligible, and he was in cognitive decline; he could still sense pitch, and musical form. His musical language within improvisations appeared intact during moment-to-moment phrases, accompanying the therapist singing, with musically coherent recitative-style chords. As the therapist, I was also able to work with M and his wife musically to help her communicate with him, and to provide emotional support. Music therapy clinical material in research studies shows how musical interventions are also effective for people with and without musical pre-skill, such as in our research study (Hsu et al. 2015).

Another clinical outcome through music therapy can be increasing happiness. Whilst this is important it is also crucial to stress the unique capacity for music therapy, delivered by a trained music therapist, to work with a whole range of emotions and feelings which could also include pain and distress. This is similar to verbal psychotherapy, which is not usually possible for people with dementia to access when in the final stages of dementia. Music therapy, therefore, is needed for this type of expressive process, and it is often a relief for this to be recognised for a person who cannot express happiness, frustration or sadness, for example, through words. Furthermore, Hsu (2015) was able to show that musical interaction using composed song can stimulate memory, laughter, movement and a sense of self.

Research

Scientific theories and emerging music and brain evidence also support the unique need for music therapy. When listening to music, several areas in the left and right hemisphere of the brain are involved in processing the various dimensions of music. For example, the auditory cortex within the temporal lobes is engaged in general auditory perception (such as pitch, intensity and duration), the basal ganglia and motor system for processing rhythm, and the amygdala for processing emotional aspects. All these phenomena make the specific intervention crucial as the latest music and brain research shows. As reported by music and brain specialists, a common observation for dementia clients is that certain songs seem to reactivate memory and cognitive functions, especially those songs with strong emotional connections (Cuddy 2005). Research on music and emotion shows involvement of the nucleus accumbens and amygdala, which triggers dopamine release supporting attention and memory (Fosha et al. 2009; Levitin 2006; Salimpoor et al. 2011). MRI evidence from semantic dementia indicates that the right temporal pole is correlated with remembering songs and the grade of deterioration. This indicates a definite neuroanatomical correlate between deterioration and the degree of musical knowledge

(Hsieh et al. 2012).

The clinical intervention in research studies is now applied more systematically, learning from what we know already. In Hsu et al.'s (2015) randomised controlled feasibility study, the use of a consistent individual music therapy framework for dementia – described also in Ridder et al. (2013) is presented – and similarly Odell-Miller (1995) showed the benefits of group music therapy interventions.

In summary, from the literature the following components are necessary: live improvised music using song and structured, directed instrumental work to meet identified aims for managing neuropsychiatric symptoms, including movement and walking; catching attention through shared musical improvisation, and creating a safe setting; regulating arousal level to a point of self-regulation, and social communication for psychosocial needs.

Music therapy as aforementioned is particularly helpful for reducing negative behaviour. The music therapist's specific role, as demonstrated in many settings in Hsu's et al. (2015) study, is to understand the general problems of the older person. Crucial in this model is the integration of music therapists with the multidisciplinary team or care staff. Music therapists show how music therapy can help meet clients' needs through video examples within music therapy sessions. Subsequently, care staff can use music and/or different ways of interacting – in between music therapy sessions – learned from the music therapists. One lady in our research study showed that her functioning abilities could be identified and promoted during music therapy sessions. Auditory and visual perception remained very sensitive and therefore she was able to adjust her music playing or bodily expressions according to the volume, intensity and dynamics of the therapist's musical input as well as the therapist's facial, vocal and bodily expressions. It was noticed over five months of music therapy that she seemed to be increasingly able to use words to respond to the therapist. She also used more complete and consistent phrases in answer to questions.

An example of the need for a music therapist's input to the general needs of another resident N are shown as follows:

- Familiar songs with familiar musical structures engage N, and motivate her to participate in musical activities, often playfully with a sense of fun. She displays a visible reduction in anxiety and agitation during sessions, and an increase in positive affect.
- Prompting and encouraging N to play the piano helps her to use and reconnect with her remaining abilities; this also encourages memory retrieval of childhood memories.
- Matching N's rhythm and pace, and then slowing down encourages N to play and interact at a slower, calmer pace. This helps to reduce her anxiety levels.
- Reading the lyrics in music books together helps N to make use of her remaining cognitive abilities, and also helps her to focus and engage in a shared activity, helping her to feel calmer and less anxious (Hsu et al. 2015).

Music therapy reduced negative behaviours for those who had music therapy. The behaviours reduced by half, mostly in the first three months, and continued to fall after the sessions were completed. In contrast, negative behaviours in those who did not have the therapy increased – again this is common in more advanced dementia. Music therapy was also seen in clinical examples to lift mood as a result of the music therapist playing upbeat music in sessions, when appropriate. Medication use in some studies (Hsu et al. 2015; Ridder et al. 2013) is also shown to decrease for recipients receiving music therapy, more than for those not receiving music therapy. This is another strong indication of how music therapy is needed for relaxation and reduction of agitation.

Care staff involvement in the research project included the music therapist/researcher showing three-minute video clips from music therapy sessions of meaningful moments to the staff. Staff then used musical elements that were effective, involving singing, rhythmic interaction and listening. Suggestions for carers' interventions between sessions, in their daily routine, were also drawn up by the music therapists. These included the following examples:

- N can become out of breath easily, which can make her feel more anxious. When she is walking around the lounge she can become breathless. Getting her to sit down in her bedroom or the quiet room could help reduce her agitation. Sitting at the piano with her can help to relax and engage her. Focusing on

singing or playing together can draw her attention away from her anxiety and help her to feel calmer.

- N enjoys picture-books but has little motivation to look at them when sitting alone. Sitting next to her and prompting her to read a book can help motivate her to participate in this activity, and sustain her attention for longer. This latter point arose from the observations of how sitting alongside N in music therapy sessions sharing instruments helped her.

In the United Kingdom and some other countries, music and other arts activities which include music therapy are now indicated as important in national guidelines for people with dementia. Relatives and carers need to know they can have access to therapies and activities which do not require complex cognitive powers but which focus upon positive non-verbal interaction which is usually possible even in the last stages of dementia. There should be choice and opportunity for people to access arts-based activities and arts therapies, especially where there is evidence of efficacy as presented in the few examples of research studies above. Music therapy is also useful for people who do not have English as their first language.

Education

It is essential to consider specific dementia awareness training for health and social care staff such as is currently delivered regularly in the United Kingdom. What appears to be missing from some of these programmes, however, is an emphasis on how to communicate through sensory, art-based media, music and other arts therapies; these could be integral to such training. Current research (Hsu et al. 2015) mentioned above and research by Wood (2015) show early indications that training carers to use music in their daily communication with people with dementia improves the quality of life for both sufferers and their carers.

The more obvious aspect of training and education is the music therapist's specific role in the training of the future workforce of qualified music therapists around the world. On the question of education, to summarise, a music therapist is needed for the following areas:

- To educate others on the specific details of music therapy in practice;
- For music therapy clinical techniques and skills sharing and for training music therapists;
- Qualified music therapy educators are required to train music therapists in universities, in the United Kingdom for example, by law. This insures protection of the public and consistent standards.

Conclusion

In considering the question of when and why a music therapist is needed, a summary of the points discussed above suggests that music therapists have unique roles to offer at all stages of dementia. In early stages working with the impact of dementia on families and carers, and in late stages, literally training carers and families in how communicating musically is effective. The specific unique interventions of music therapists are helpful at all stages for the person with dementia. At all five stages of dementia, musical and music therapy interventions are needed and should be defined as central pathways of care. In some stages music therapists are needed to work more directly with many participants, especially in the later stages when verbal interventions do not work, and the specific skill of the music therapist to work through music is needed. In earlier stages when people with dementia can still access more mainstream musical activities, they may work alongside others who are delivering community choirs, providing advice and sometimes participating.

More work is needed to map exactly when a music therapist is needed, but clearly there is now evidence of trends showing the unique intervention for people with dementia clearly defined in early preventative stages. This can slow down the process of deterioration of communication and expression in these early stages, and also in later stages, especially when language deteriorates and there are behavioural and psychological problems.

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Lecture 3

Improvisational music therapy in neurological rehabilitation

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This lecture paper discusses improvisational music therapy in neurological rehabilitation. The exemplification of actual improvisational processes and ethical considerations in neurological rehabilitation will be the focus of this paper. With reference to music therapy practice in both inpatient and home-based settings, music therapy research, as well as to music sociology and neurobiology, the paper will respond to the two questions: *'Why music?'* and *'Why and when is a music therapist needed?'*.

Music and music therapy in neurological rehabilitation

Music therapy has been increasingly established in neurology and neurological rehabilitation, both in practice and research within the last two decades (for overviews, see Aldridge 2005; Baker & Tamplin 2006; Baumann & Gessner 2004; Bradt et al. 2010; Schmid 2014). The therapeutic application of music focuses on core issues following neurological illness and trauma such as:

- ❑ reduction of drive;
- ❑ disorders of consciousness;
- ❑ disturbances in cognitive and executive functions;
- ❑ coping with loss of functions and social roles;
- ❑ speech and language disorders

In addition, a variety of specific assessment tools and manuals based on music-making or musical elements such as rhythmic or melodic patterns have been developed. Baker and Tamplin

(2006), and Weller and Baker (2011) implemented manuals for persons with altered states of consciousness or cognitive challenges. For the rehabilitation of individuals with aphasia, Baker (2011) introduced an adapted Melodic Intonation Therapy approach, and Jungblut and Aldridge (2004) invented the programme SIPARI, a type of rhythmic-melodic voice training. Recently, Magee and colleagues (2012) have developed the instrument MATLAS for the assessment of low awareness states, and MATADOC (Magee, Siegert, Lenton-Smith & Daveson 2013), a music therapy assessment tool for disorders of consciousness. Improvisational music therapy has been implemented for the assessment and therapy with individuals with multiple sclerosis and traumatic brain injury (Gilbertson & Aldridge 2008; Schmid 2005; 2014).

The individual's perspective in neurological rehabilitation

Individuals in neurological rehabilitation are often confronted with various types of challenge at one point in time. They may experience a complexity of symptoms affecting their communicative, physical, psychological, cognitive, social, and emotional abilities (Schmid 2005). The severity and intensity of the changes following neurological trauma may vary (Daveson 2008; Kolb & Wishaw 2004). In addition the individual's family, children and friends might be affected by the often profound changes, expressing needs for psychosocial support themselves (Gilbertson 2015; Schmid 2015; Schmid & Ek Knutsen 2016). To be able to fully meet an individual's needs in his or her rehabilitation and coping process, a broad range of music-based and music therapeutic approaches, techniques and manuals must be available; these should be applied by qualified music therapists (Jochims 2005).

A case vignette

A 72-year old man with Morbus Parkinson was referred to music therapy by his neurologist on a neurological ward in a general hospital. In the music therapy room, the man decides to play on a steel drum, as he became fascinated by both the shape and the sound of the instrument. After an initial phase of exploration, a lively and vivid improvisation takes shape, jointly co-created by the man and the music therapist. With mutual initiatives, sounding the depth of a broad range of dynamic and expressive qualities in metric and non-metric modes, both drive forward the music. Finally the man determines the end of the joint improvisation by setting the last tone, turning round to the therapist and commenting on the spontaneous joint music-making with the words: "I feel so lightened up!"

Music experience in music therapy

Music-making can provide a bodily experience, causing a perceived change of physical condition in individuals. Improvising actively engages the senses, giving kinaesthetic feedback and sensory stimulation (Bruscia 2014: 142). A sensory, body-based expression of our constitution and way to act and interact with the world becomes audible and can be shared with others (Schmid 2005). As human beings, we own an inborn *communicative musicality* (Malloch & Trevathen 2009), enabling us to distinguish elements of rhythm, pitch and melody, and interact on a bodily and musical level with others. This capacity is the vivid agents of our social and emotional lives throughout our lifespan. In improvisational music therapy, *communicative musicality* constitutes the underlying matrix for shared meaning-making and understanding of the individuals involved (Schmid 2014).

Music as a composed, improvised or performed piece of art can be part of the music therapy process. However, an individual's experiences with the relational processes emerging in joint music-making – intrinsic and extrinsic in their nature – are essential and unique features of music therapy. These *music experience*s can take place on three different levels:

- the intrinsic relationships that are created between the sounds themselves;
- the extrinsic relationships that are created between the sound experience and other human experiences;
- the interpersonal and sociocultural relationships inherent in the process of making or experiencing music (i.e. "musicking") (Bruscia 2014: 118).

Autopoietic processes

Intrinsic and extrinsic music experiences are central to improvisational music therapy. They are the origin of an individual's self-activity, despite disruptions and limitations following neurological trauma. In improvisational music therapy players and singers invent the music by acting and interacting with each other, gaining orientation and creating meaning. These processes can be related to the concept of self-organisation and a systemic-constructivist perspective referring to the *theory of autopoiesis* developed by two Chilean philosophers and neurobiologists, Maturana and Varela (1987). Maturana and Varela intended to develop a theoretical model for the complex processes of living systems, going beyond existing mechanistic, one-way, cause-and-effect-patterns. Self-organisational processes are based on the idea that life constantly invents itself in a dynamic interplay of maintaining and modifying, accepting and releasing (Cormann 2011). Process and product become the same as we experience ourselves and others while forming the ground for these experiences to happen. We hold and experience ownership over the developmental and relational processes we are part of. Improvisational music therapy stimulates autopoietic processes, and individuals enactively implement the therapeutic course instead of being the recipient of a programme. As demonstrated in the case vignette, elements like emergence, autonomy, agency, sense-making, and changes in bodily-emotional perception can occur. Consequently, a professional therapeutic setting with a qualified music therapist provides indispensable conditions for autopoietic processes in individuals affected by neurological illness and trauma (Schmid 2014).

A second case vignette

In a research project on home-based music therapy for individuals living with amyotrophic lateral sclerosis (ALS) and their caring spouses (Schmid & Ek Knutsen 2016), a participating couple gave detailed feedback regarding their experiences of listening to music as part of their weekly music therapy sessions. Listening to music became a meaningful and favourite activity for the couple, as they could spend quality time together and experience a sense of flow. They had differing experiences, however, with regard to listening to self-selected, recorded music versus listening to live music, performed by the music therapist:

- Their preferred music triggered the couples memories and associations. They each selected songs and musical pieces meaningful to them from Spotify or YouTube and played them to each other. In this way, they could present each other their favourite music, and share meaningful histories alongside the chosen pieces.

- In contrast, listening to live music performed by the music therapist and tailored to the couple's situational wishes and needs, was connected to the experience of an exclusive concert taking place in their living room, and the experience of living in the present.

- Improvisations by the therapist on a guitar or a kantele, a small pentatonic string instrument, enhanced the feeling of living in the present and facilitated relaxation in the couple (Schmid & Ek Knutsen 2016).

In summary, listening to music was found to be an *activity*. While different approaches to music listening carried different experiences and meanings for the couple, listening to preferred, self-selected music could be conducted *without* a music therapist being present, and whenever the couple felt like doing so. The findings of this explorative study are relevant with respect to the question *'Why and when is a music therapist needed?'* and need to be further investigated. However, in light of long-term processes in neurological rehabilitation in various settings, and with the possibility to include family members to enjoy preferred music together at home, the music therapy discipline is asked to initiate music experiences owned and conducted by individuals themselves, without a music therapist being present.

Why music matters[6]

The *temporal organisation* of music is a basic structuring component in both music-making and music-listening. The perception of temporal structure and regularity of music is essential for the coordination of movement, and invokes brain regions involved in motor control (LaGasse & Thaut 2012). As an ongoing underlying matrix of music, *temporal organisation* in improvisation provides "a moment-by-moment scaffolding on which people can develop their own embodied musical participation" (Procter 2011: 252). In improvised music, an individual does not need to fit into a given musical structure, or conform to the tempo or metre of a pre-composed song or music-based exercise. In contrast, he or she *co-creates the temporal organisation* of the music emerging, being directly involved in the process of organising time and activity, experiencing a sense of "a continuing present" (Frith 1996: 148f). This experience of creating the music in the framed openness of mutual activity is unique to improvisational music therapy. It is dynamic and relational in its very nature, allowing individuals to attune with each other over time, meaning that they coordinate and synchronise their mutual activities in the simultaneity of music-making over time. The psychologists Lindenberger, Li, Gruber and Müller (2009) found cortical phase synchronisation in guitar players improvising with each other. In their EEG-based study, 'Brains swinging in concert', they concluded that interpersonally coordinated actions are preceded and accompanied by between-brain oscillary couplings.

However, the temporal organisation of music, the co-creation, coordination and synchronisation of activities are integral ingredients of social micro-processes happening in joint music-making (Hesmondhalgh 2013). They *are* features of "music's ability to connect people" (Hesmondhalgh 2013: 117), and in turn facilitate people to connect in music in meaningful ways. They exemplify the "mutual tuning-in in the formation of relationships, allowing for the experience of *We*, and forming the very essence of all meaningful human communication", as the Austrian philosopher and sociologist Alfred Schütz has put it in his essay *'Making music together'* (Schütz 1951: 92).

For individuals in neurological rehabilitation who do not or cannot respond to countable or objective measurements of a standardised music manual, nor join a pre-composed piece of music due to severe, complex and limiting conditions following neurological trauma, possibilities for the experience of *We* become most important. This is a question of ethics, pointing to accessibility of therapy as a requirement for inclusion to happen. Music improvisation invites people to join in – wherever the starting point may be. In mutual co-creation with a trained music therapist, who might first of all be a listener, they are encouraged to tell their narratives, sustaining a sense of identity, and creating feelings of belonging and connectedness.

Closing thoughts

The benefits of music therapy in neurological rehabilitation are currently more and more implemented in interdisciplinary clinical practice, understood, extended and supported by findings from the neurosciences. At the same time, however, we need to identify limitations and potential contra-indications of music and music therapy in neurological rehabilitation.

David Aldridge (2005) described neuro-degenerative diseases as *dialog-degenerative*, pointing to the necessity of averting isolation of people, and critically reflecting on music therapy's role and responsibility in a medical treatment context. In autopoietic processes an individual's intrinsic and extrinsic experiences form both music and relationship. Isolation can be overcome, and embodied dialogue take place, co-created and led by those involved. All these aspects may motivate an individual to take part and, more importantly, stay involved in often long-lasting and demanding rehabilitation processes.

[6] In his book *'Why Music Matters'* (2013), David Hesmondhalgh, Professor for Media, Music and Culture at the University of Leeds, critically investigates and questions music's value for the lives of people and societies.

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Reflection paper

Music therapy for prevention of stress and mild cognitive impairment

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This short reflection paper serves as another perspective on the contributions on music therapy and neurodegenerational diseases presented at the Music Therapy Symposium, April 2016, in Aalborg (Odell 2017; Ridder 2017; Schmid 2017). This author participated in the discussion panel as a music therapy researcher in stress- and trauma-related disorders.

The fact that the number of people diagnosed with dementia and other neurodegenerational diseases in our Western societies is increasing, is worrying. In preparation for this symposium I investigated if there is a relationship between the amount of life stress and the onset of dementia or mild cognitive impairment (MCI), a condition of a slight but measureable decline in cognitive abilities, including memory and thinking skills. According to the Alzheimer's Association a person with mild cognitive impairment is at an increased risk of developing Alzheimer's or another form of dementia (http://www.alz.org/dementia/mild-cognitive-impairment-mci.asp).

Several studies point to a relationship between stress and MCI/dementia. Researchers from Albert Einstein College of Medicine in New York followed a group of 70-year old persons from Bronx (n=507). At a three-to-four years follow-up, 71% had developed mild cognitive impairment, and those who experienced high and persistent levels of stress at baseline were twice as likely to develop mild cognitive impairment than those who felt less stressed (Katz et al. 2015). In a prospective longitudinal population study 800 middle-aged Swedish women were followed for 38 years, during which 153 developed dementia at a mean age of 78 years. The researchers found that the number of psychosocial stressors (e.g. divorce, widowhood, work problems and family illness) and long-standing distress were independently associated with the onset of Alzheimer's dementia (Johnassen et al. 2013). Those who had experienced the highest numbers of stressful events in their middle age had 21% higher risk of developing Alzheimer's dementia, and 15% higher risk for other types of dementia.

In order to prevent the onset of dementia and other neurodegenerative disorders in the population, reduction of stress in general is an important focus.

From brain research, we know that chronic stress attacks the brain in several ways. Continuous high doses of the stress hormone cortisol destroy brain cells in whole areas of the prefrontal cortex, causing limited ability of decision-making, planning, reflection and emotional regulation (Ansel et al. 2012; Ghosh, Laxmi & Chattarji 2013). Cortisol also reduces the production of serotonin and dopamine and thereby decreases wellbeing and motivation (Tafet et al. 2001). The plasticity of the brain is reduced because cortisol inhibits the production of new brain cells (Issa et al. 2010). Finally, cortisol increases the connection between hippocampus and amygdala, whereby a higher level of arousal and vigilance is stimulated (Chetty et al. 2014).

What can be done to decrease stress and thereby prevent the onset of dementia? Studies in brain response to music interventions show that the hyperactivated connection between amygdala and hippocampus can be reduced (Koelsch 2009), and that brain areas connected to emotions, pleasure, motivation and reward are stimulated during music listening (Blood & Zatorre 2001). A meta-analysis of 400 studies shows how music interventions can reduce stress, provide social engagement and improve the immune defence (Chanda & Levitin 2013). Several meta-analyses show that music therapy and music medicine interventions decrease stress levels in medical settings, occupational settings and everyday life (Dileo & Bradt 2007; Pelletier 2004). Music listening, and amateur playing and singing, choir singing, recreational music-making, playing in bands, music groups etc. are improving health and decreasing stress (Beck 2013). A recent Danish epidemiologic study shows that there is a connection between health and daily music activities (Bonde, Ekholm & Juel 2015).

When is a music therapist necessary? When a

person suffers from chronic clinical stress conditions it can be very difficult to heal oneself. The autonomous nervous system is highly dysregulated, sleep is disturbed and there can be serious symptoms such as high blood pressure, depression, loss of voice, overwhelming fatigue and cognitive problems. There are many possible treatment options on the market – but what is special about music therapy? As already described, music interferes directly with the stress system in the brain, and is able to calm down the nervous system by creating a safe and holding environment. Music listening can be used together with guided relaxation and imagery. In the receptive music therapy method – Guided Imagery and Music – the patient suffering from stress works with spontaneous inner imagery while listening to music in an altered state of consciousness. The patient tells the therapist about the imagery and they work together to explore emotions, body sensations, memories, visual imagery and thoughts. A randomised controlled study showed that 20 patients suffering from stress on sick leave significantly increased coping skills, reduced anxiety and depression, and decreased cortisol levels with Guided Imagery and Music (Beck, Hansen & Gold 2015). Music therapy interventions with post-traumatic stress (PTSD) populations have shown improvement in sleep quality (Jespersen & Vuust 2012), PTSD symptoms (Carr et al. 2012), trust and social engagement (Bensimon, Amir & Wolf 2013).

Summing up: the task to keep the brain healthy is not only taking place in the head (the brain is enactive, embodied and embedded) it is playing together with the body and its sensory pathways, other human beings and creatures, and the physical world and environment. In order to prevent stress and thereby the onset of MCI and dementia, we as citizens need to be able to participate in mutually engaging, supportive, communicative environments – which can be facilitated by musical meetings and activities. Active engagement with music is important for public health and should be widely supported in schools, institutions, hospitals and local communities. Music therapy is a cheap, non-invasive, easily administered treatment option for people suffering from serious stress symptoms and disorders.

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