EXPERIENCES OF GROUP MUSICAL INTERVENTION FOR
PEOPLE WITH DEMENTIA

Section A: The impact of live and recorded group music interventions
with active participation for people with dementia

Word Count: 7592

Section B: A multisensory communicative environment through music for
people
with late stage dementia

Word count: 7360

Overall word count: 14952

A thesis submitted in partial fulfilment of the requirements of
Canterbury Christ Church University for the degree of
Doctor of Clinical Psychology

JUNE 2019

SAalomons
Canterbury Christ Church University
Acknowledgements

I would like to thank the residents with dementia, carers and musicians who took part in the study without whom it would not have been possible. I am very grateful to my supervisors Dr Paul Camic, Dr Sebastian Crutch and Julian West for their support, knowledge and enthusiasm. I am particularly grateful to Paul for being so encouraging and reading so many drafts. I would like to thank my parents for their support. I know that dad would have been proud. I would also like to thank Tom, Tilda and Bea for being understanding, encouraging and believing in me.
Summary of the Portfolio

Section A was a literature review exploring the impact of group music intervention using active participation on behavioural, psychological, physiological, cognitive, quality of life and communication outcomes for people with dementia. Interventions using live music were compared with those using recorded music. The literature revealed an overall positive impact however the results were not consistent due to the variability in methodological rigour. There was little difference between live and recorded music. Further research is indicated to explore the relational or communicative benefits of group music intervention using qualitative methodology in line with national guidelines and supporting person- and relationship-centred care.

Section B allowed a conceptual understanding to be built around communication; how people with dementia may express themselves non-verbally and interact with others in response to a live music group over time. In this qualitative study visual grounded theory was used to analyse data. It was theorized that the intervention facilitated a multisensory communicative environment allowing for verbal and non-verbal communicative actions, social interactional components and agency to develop. The theory has implications for dementia care and Music for Life groups. Ideas for future research include a larger scale study and a widening of the location and sample characteristics.
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Section A

The impact of live and recorded group music interventions with active participation for people with dementia

Word Count: 7592

For submission to Arts and Health
GROUP MUSIC INTERVENTION AND DEMENTIA

Abstract

The symptoms of dementia are the largest cause of disability and dependency in older adults globally. National guidelines have highlighted the importance of communication, relationship building and meaningful activities for people with dementia using non-pharmacological interventions such as music. This literature review examines the existing evidence base for the impact of group music intervention involving active participation on outcomes for people with dementia. Both live and recorded music interventions were included. PsychINFO, Medline, CINAHL, Web of Science, PubMed, the Cochrane library and Google Scholar were searched and 15 studies met the inclusion criteria. The results indicated that there was a positive impact on behavioural and psychological symptoms, quality of life, communication and some aspects of cognitive function for people with dementia, however, methodological limitations make it difficult to offer firm conclusions. Studies using recorded music indicated more consistent positive behavioural and psychological outcomes however studies using live music reported a benefit to communication and relationships. Further research exploring the impact of group music interventions on communication using qualitative analysis is recommended due to the paucity of the evidence base within this area and in line with national guidelines.

Key words: dementia, group music, outcomes, communication
Introduction

Dementia

Dementia has been defined as a syndrome characterised by a deterioration in cognitive function, beyond what would be expected from normal ageing processes. The deterioration is severe enough to impact with daily life. It is usually of a progressive and chronic nature and can affect memory, thinking, orientation, communication, language, learning capacity and judgement (World Health Organization, WHO, 2017). The symptoms of dementia are varied and impact differently on each individual but are the largest cause of disability and dependency in older adults globally. According to WHO there are currently 50 million people with dementia worldwide, estimated to rise to 82 million people by 2030.

Dementia can be caused by several different diseases, many of which are associated with an abnormal build-up of proteins in the brain. This leads to a reduction in nerve cell functioning and ultimately nerve cell death. As this happens different parts of the brain shrink (National Health Service, 2018) leading to psychological and behavioural symptoms and a deterioration in cognitive function. This is the process underlying Alzheimer’s Disease, Dementia with Lewy bodies and Frontotemporal dementia. Vascular dementia, by contrast, involves reduced blood flow to the brain as a result of narrowing or blocking of blood vessels. Rarer causes of dementia include Posterior Cortical Atrophy (PCA), Primary Progressive Aphasia (PPA) and Huntington’s disease (Alzheimer’s Society, 2019). Dementia has a far reaching impact on both an individual and family members including reduced wellbeing and quality of life (QoL), resulting in many challenges for both formal and informal caregivers (Svansdottir & Snaedal, 2006). The majority of care is provided by family members who may experience considerable physical, emotional and economic strain.
Needs of People with Dementia

The field of dementia care has been greatly influenced by Kitwood’s (1997) theory of “personhood” which advocates that the needs for people with dementia include comfort, attachment, inclusion, occupation, and identity. Although Kitwood’s ideas have been highly influential over time there has been a move towards more relational theories of dementia. Nolan, Davies, Brown, Keady and Nolan (2004) claim that person-centred care fails to adequately capture the reciprocity and interdependency that underlies caring relationships and that it needs to be expanded to a relationship-centred care approach underpinned by a psychosocial theory of relating they have identified as the ‘senses framework’. Within this framework, Nolan et al. (2004) suggest that all parties involved in caring need to experience relationships that promote a sense of security, belonging, continuity, purpose, achievement, and significance.

Policy and Intervention

Dementia care has become the focus of many national guidelines and policies including guidance from the National Institute for Health and Care Excellence (NICE) and NHS England. The latter funded the most recent Dementia Care Pathway produced by the National Collaborating Centre for Mental Health (NCCMH) in July 2018. The pathway sets out key commissioning and service development aspects focusing on diagnosis, treatment and improving post-diagnostic treatment and support for people with dementia and their carers. Both the NCCMH and NICE (QS1, 2010 and QS30, 2013) recommend that treatment and support include maintaining the wellbeing for people with dementia and their carers by helping them to build relationships and engage in meaningful activities.

However, according to Douglas, James and Ballard (2004) treatment has tended to focus on the behavioural and psychological symptoms of dementia including agitation,
aggression and mood disorders as well as changes to cognitive function. Traditionally, these symptoms have been treated pharmacologically but concern has been raised about the inappropriate use of psychoactive drugs due to their reduced efficacy and unwanted side effects (Talerico, Evans & Strumpf, 2002). According to Oliveira et al. (2015) non-pharmacological interventions have important and significant efficacy for improving symptoms of dementia and should be considered as the first intervention to be implemented in response. Music based intervention is one such non-pharmacological intervention.

According to McDermott (2013) music making offers people with dementia, who are non-verbal, an alternative method of communication and self-expression. Music intervention has also been found to decrease stress hormones (Spintge, 2000), increase relaxation and emotional well-being (Brotons & Koger, 2000), provide a sense of safety and reduce anxiety (van der Steen et al., 2017). According to Baird and Samson (2015) people in the late stages of dementia may remain responsive to music even if not responsive to other stimuli: this may be because musical memory regions in the brain are relatively spared compared to cognitive function. It may also be because the basis of language is musical in nature and this predates the more lexical functions (Aldridge 1996). Music often accompanies life events and emotional experiences, where “musical memories” can be stored longer than non-musical memories (Baird & Samson, 2009). Music-based interventions have been shown to aid recall of these life events and associated emotions (van der Steen et al., 2017).

Music interventions can come in many different guises, using a variety of methods including singing, passive or active participation, instrument playing and live or recorded music. Intervention can be on an individual or group level, however research has shown that group music intervention can help prevent social isolation by encouraging social interaction and encourage communication of feelings and ideas (Aldridge, 1996; Cho, 2018). According to van der Steen (2017) group music intervention provides opportunities to make connections
GROUP MUSIC INTERVENTION AND DEMENTIA

with other people through non-verbal musical communication which may help people cope with their illness and build relationships. Instrument playing and group musical activities are “morale-building social experiences” that help people with dementia gain strength and support from the other members of the group (Lin et al., 2010, p.676).

Previous literature reviews

Several literature reviews have been completed looking at music interventions and dementia but few have looked solely at group music interventions. Ing-Randolph, Phillips and Williams (2015) reviewed eight studies up to 2014 that used group music interventions and measured the impact on anxiety for people with dementia. They concluded that the interventions looked promising but the small number of studies and methodological concerns limited their ability to draw a firm conclusion. Scott and Kid (2016) completed a review of six studies where they looked at planned group musical activities that contained singing and measured anxiety, depression or agitation for people with dementia and concluded that there was insufficient evidence for the impact of the musical activities. A more recent review (van der Steen et al., 2017) involved Randomised Controlled Trials (RCTs) and group music based interventions. The studies reviewed included any kind of music intervention, passive or active, although the intervention needed to meet the specific criteria of music therapy. They concluded that the music-based treatments did improve symptoms of depression and overall behavioural problems but not specifically agitated or aggressive behaviour. Van der Steen et al. (2017) recommend that future reviews need to focus on the following areas; to differentiate between or draw together types of musical intervention (such as live, recorded, active or passive) and groups of symptoms.

Rationale for this review

Due to the vast range of musical interventions (for example signing or listening to music amongst others) this review will narrow the focus to those that contain active
GROUP MUSIC INTERVENTION AND DEMENTIA

participation. Active participation, in this review, describes being engaged with the music via composition and instrument playing (in contrast to passive music techniques such as listening to music). Active participation was chosen because according to Raglio and Oasi (2015) it has the power to alleviate behavioural and psychological symptoms as well as benefit communication and relationships. This is important because it is in line with national guidelines that promote both person centred and relational models of dementia care (NICE guidelines and the Dementia Care Pathway, 2018). Furthermore, the literature for active participation and music intervention for people with dementia has not been reviewed before. Following on from Van der Steen’s (2017) recommendations this review will also look at whether there is difference between the impact of live in comparison to recorded music interventions. Therefore, the current review seeks to answer the following questions:

1. What impact does group music intervention, with active participation, have on the following outcomes for people with dementia: cognitive function, behavioural or psychological symptoms, physiological responses, quality of life and communication?

2. Is there a difference in impact on these outcomes between using live or recorded music within the intervention?

Methodology

Search Strategy

A systematic literature review was completed using the following databases: PsychINFO, Medline, CINAHL, Web of Science, PubMed, the Cochrane library and Google Scholar. The following search terms were used (group AND music) OR “group music” AND (dementia OR Alzheimer’s* OR “vascular dementia” OR “frontotemporal dementia” OR “dementia with lewy bodies”). This yielded too many results on Web of Science (17,794) and CINAHL (2,453) and so for these two databases only (group AND music) were removed to help narrow the search. Titles were reviewed from the initial searches, for those studies that met the inclusion criteria abstracts were then reviewed. The full text of each study that met the inclusion criteria
was then retrieved and a hand search of the references was completed to identify further relevant studies. This process resulted in fifteen studies that met the inclusion criteria. Figure 1 details this process.
Group Music Intervention and Dementia

Initial search results using the following databases: PsychINFO, Medline, CINAHL, Web of Science, PubMed, the Cochrane library and Google scholar.

Search results combined n= 678

Records excluded n= 648

Exclusion reasons: Not related to topic, book chapters, individual music, singing as the only intervention, combined intervention, duplicates, not active participation, not in English

Titles reviewed

Articles included n= 30

Abstracts screened

Excluded following abstract screen

n= 15

Exclusion reasons: Not related to topic, previous reviews on different topics, individual music intervention

Articles included n= 15

Full text articles retrieved and assessed for eligibility

n = 13

Excluded following full text review

n= 2

Exclusion reasons: Intervention restricted to singing, study looking at carer’s perspective

References searched for further articles

Number added = 2

Final number included

n= 15

Figure 1. The process of selection
GROUP MUSIC INTERVENTION AND DEMENTIA

Selection criteria

Studies were included in the review if:

- They specifically looked at group music interventions rather than individual music intervention
- The intervention focused on music rather than related interventions such as singing on its own
- The intervention involved an opportunity for active participation using instruments
- Participants were people with a type of dementia
- Published in a peer reviewed journal
- Written in English

Inclusion and exclusion criteria were not based on the design of each study or the outcome measured and were not date limited in order to broaden the search.

Data extraction and analysis

A table was used to help extract and synthesise data from each of the relevant studies. The data extracted included information about the type of music (live or recorded), location of the setting (residential or community), type of intervention, design, methodology, measures and key results. Live music refers to music being created by the facilitator using instruments in the room. Recorded music involves pre-recorded music being played by digital means or CD. The table and details of each study are shown below and the studies are grouped according to the type of music used (table 1).
<table>
<thead>
<tr>
<th>Type of music</th>
<th>Author, year, country</th>
<th>Location</th>
<th>Participants</th>
<th>Intervention</th>
<th>Design &amp; Methodology</th>
<th>Measures</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Live</td>
<td>Keough et al. (2017) USA</td>
<td>Community</td>
<td>10</td>
<td>Moderate dementia</td>
<td>Singing, drumming and movement accompanied by live instrument playing from music therapist. Opportunity for solos and improvisation</td>
<td>Observational, purposive sample, participants chosen by researchers and local charity</td>
<td>Examined trends using checklists: expressive language and emotion and musical behaviour</td>
</tr>
<tr>
<td>Live</td>
<td>Chu et al. (2014) Taiwan</td>
<td>Residential</td>
<td>104</td>
<td>Mild-severe dementia</td>
<td>Music therapist – mix of playing instruments by therapist – singing along, rhythmic accompaniment, leading and improvisation opportunity versus a control group</td>
<td>A prospective, randomized, controlled, parallel-group design</td>
<td>Cornell Scale for Depression, salivary cortisol measure, MMSE</td>
</tr>
<tr>
<td>Live</td>
<td>Solé et al. (2014) Spain</td>
<td>Residential</td>
<td>16</td>
<td>Mild-severe dementia</td>
<td>Singing, listening to music, playing musical instruments, composition/improvisation, and movement to music with a music therapist</td>
<td>One group pretest-posttest design</td>
<td>GENCAT for Quality of Life (Verdugo, 2008), affect and participation as measured by video analysis using 5 observation categories Brotons &amp; Pickett-Cooper (1996): (a) verbalization, (b) physical contact, (c) visual contact (looks), (d) active participation in music activities, and (e) emotions/ facial affect and body expressions</td>
</tr>
<tr>
<td>Live</td>
<td>Cooke et al. (2010) Australia</td>
<td>Residential</td>
<td>47</td>
<td>Early- to mid-stage dementia</td>
<td>Live group music with two music therapists with additional recorded music versus reading control</td>
<td>RCT with cross over design; Outcomes measured at Cohen-Mansfield Agitation Inventory - Short Form (CMAI-SF), Rating Anxiety in Dementia Scale (RAID),</td>
<td>Participation in the music programme did not significantly affect agitation and anxiety Increase in verbal aggression for both groups</td>
</tr>
<tr>
<td>Live</td>
<td>Choi et al. (2009) South Korea</td>
<td>Community</td>
<td>20</td>
<td>Severity not specified</td>
<td>Singing songs, analysis of libretto, making musical instruments, playing instruments such as pianos and hand bells, song drawing, and song writing</td>
<td>Case control group design</td>
<td>Geriatric Depression Scale (GDS).</td>
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<tr>
<td>Live</td>
<td>Ledger et al. (2006) Australia</td>
<td>Residential</td>
<td>45</td>
<td>moderate to severe dementia</td>
<td>Intervention: music therapy group run by two music therapists: listening to music played by the therapist, choosing or requesting favourite songs, guessing song-titles from melodic/lyric clues, singing, playing instruments, moving to music, and discussing feelings and memories.</td>
<td>Longitudinal case control group design</td>
<td>Cohen-Mansfield Agitation Inventory (Cohen-Mansfield, J. (1989)).</td>
</tr>
<tr>
<td>Live</td>
<td>Takahashi et al. (2006) Japan</td>
<td>Residential</td>
<td>43</td>
<td>Mod-severe dementia.</td>
<td>Over a period of two years, once weekly music therapy. Active reminiscence music therapy by a trained music therapist. Vocalization, singing songs (seasonal songs and familiar songs), and playing in a concert. Playing percussion instruments, particularly</td>
<td>Convenience sample case control group design</td>
<td>Intelligence test - Revised Hasegawa Dementia Scale (HDS-R), cortisol via saliva, blood pressure</td>
</tr>
<tr>
<td>Group</td>
<td>Study</td>
<td>Setting</td>
<td>Sample Size</td>
<td>Intervention</td>
<td>Control</td>
<td>Outcome Measures</td>
<td>Findings</td>
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</tr>
<tr>
<td>Live</td>
<td>Svansdottir et al. (2006)</td>
<td>Residential</td>
<td>38</td>
<td>Moderate or severe Alzheimer’s disease (AD)</td>
<td>Live instruments</td>
<td>Case control group design</td>
<td>Behavioural and psychological symptoms using the Behavior Pathology in Alzheimer’s Disease Rating Scale (BEHAVE-AD) (Reisberg et al., 1987)</td>
</tr>
<tr>
<td>Live</td>
<td>Suzuki et al. (2004). Japan</td>
<td>Residential</td>
<td>10</td>
<td>Severity not specified</td>
<td>Music therapy included singing songs and playing percussion instruments</td>
<td>Quasi-experiment.</td>
<td>MMSE, behavioural functional assessment using N type Mental States Scale, N type Activities of Daily Living (Kobayashi et al. (1988)) and the Multidimensional Observation Scale for Elderly Subjects (MOSES) (Helmes et al., 1987); endocrinological stress evaluated using salivary CgA.</td>
</tr>
<tr>
<td>Live</td>
<td>Jennings et al. (2002) USA</td>
<td>Community</td>
<td>16</td>
<td>Music therapist sang familiar old songs, encouraged sing-alongs, and provided percussive instruments</td>
<td>One group pretest-posttest design</td>
<td>Modified Cohen-Mansfield Agitation Inventory-Community Form (CMAI; Cohen-Mansfield, Marx, &amp; Rosenthal,</td>
<td>Reduction in agitation for a brief time particularly specific behaviours e.g. verbal disruption, wandering, and restlessness than physical agitation.</td>
</tr>
<tr>
<td>Recorded</td>
<td>Method</td>
<td>Location</td>
<td>Sample Size</td>
<td>Diagnosis</td>
<td>Intervention</td>
<td>Measurement</td>
<td>Results</td>
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</tr>
<tr>
<td>Ho et al. (2018)</td>
<td>China</td>
<td>Residential</td>
<td>73</td>
<td>Moderate dementia</td>
<td>Intervention: 16 half-hour sessions with multi-sensory components over eight weeks. Control group received standard care. Music group facilitated by a trainee expressive arts therapist and a social worker from residential home.</td>
<td>Neuropsychiatric Inventory (NPI) (Leung, Lam, Chiu, Cummings, &amp; Chen, 2001) used to measure the behavioural and psychological symptoms.</td>
<td>Significant improvement in agitation, aberrant motor behavior and dysphoria but not irritability and subjective mood compared to the control group.</td>
</tr>
<tr>
<td>Gallego et al. (2015)</td>
<td>Spain</td>
<td>Residential</td>
<td>42 patients</td>
<td>Mild to moderate Alzheimer disease (AD)</td>
<td>Run by two music therapists: preferred recorded music with rhythmic accompaniment with percussive instruments and movement Weekly for 6 weeks.</td>
<td>Cognitive - MMSE, psychological and behavioural symptoms were measured using the Neuropsychiatric Inventory (NPI), Hospital Anxiety and Depression Scale (HADS) and the Barthel Index (BI).</td>
<td>Music therapy lessened symptoms of most neuropsychiatric disorders, especially anxiety and depression. However, depression as measured on the NPI did not improve significantly Improvement in delusions, hallucinations, irritability, and agitation.</td>
</tr>
<tr>
<td>Sung et al. (2012)</td>
<td>Taiwan</td>
<td>Residential</td>
<td>54</td>
<td>Severity not detailed</td>
<td>Research assistant trained in music intervention. Use of preferred recorded music with active percussive instrument encouragement. 30 mins twice a week for 6 weeks. Control group: usual care</td>
<td>Cohen-Mansfield Agitation Inventory (CMAI) (Cohen-Mansfield et al., 1989), Rating of Anxiety in Dementia (RAID) scale (Shankar et al., 1999)</td>
<td>Group music intervention had a significant effect on reducing anxiety scores. Also significantly decreased the agitation scores over time however this was not significantly different from the control.</td>
</tr>
<tr>
<td>Lin, et al. (2011)</td>
<td>Taiwan</td>
<td>Residential</td>
<td>104</td>
<td>Moderate dementia</td>
<td>Playing instruments, therapeutic singing, listening to specially selected music</td>
<td>Cohen-Mansfield Agitation Inventory (C-CMAI), MMSE</td>
<td>Group music therapy reduced agitated behaviour.</td>
</tr>
<tr>
<td>Live vs recorded</td>
<td>Raglio et al. (2015) Italy</td>
<td>Residential and community</td>
<td>120 Moderate-severe dementia</td>
<td>Usual care versus listening to recorded music versus improvised music therapy with instruments</td>
<td>Multicentre RCT</td>
<td>Music therapy: 20 individualized 30-minute sessions, twice a week for 10 weeks with a certified, specifically trained music therapist</td>
<td>The Neuropsychiatric Inventory (NPI), Cornell Scale for Depression in Dementia (CSDD), and Cornell-Brown Scale for Quality of Life in Dementia (CBS-QoL), Music Therapy Check List—Dementia</td>
</tr>
</tbody>
</table>
Structure of the review

This review was designed to investigate a question of two parts; (i) what impact does group music intervention, with active participation, have on the following outcomes for people with dementia: cognitive function, behavioural or psychological symptoms, physiological responses, quality of life and communication. (ii) Is there a difference in impact on these outcomes between using live or recorded music within the intervention?

In this review, the outcomes are the differences in cognitive function, behavioural or psychological symptoms, physiological responses, quality of life and communication attributed to the music group intervention. Due to the studies measuring a variety of variables with a range of designs the review is structured according to the type of music used. The studies will be separated into three corresponding sections (live music, recorded music and both) where they will be summarised, critiqued and evaluated within a narrative. A summary will then draw the results together to answer the question of the review. An overall critique of the studies will then be presented followed by clinical and research implications and a conclusion.

Method of critique

All of the studies were quantitative except for one qualitative study which used checklists with observations to provide data (Keough, King & Lemmerman, 2017). Due to the variation in designs the Specialist Unit for Review Evidence (SURE, 2018) critical appraisal checklists were used. SURE is adapted from the former Health Evidence Bulletins Wales (HEBW) checklist, the NICE Public Health Methods Manual (2012) and previous versions of the Critical Appraisal Skills Programme (CASP) checklists. All versions of the checklist ask similar questions and the main version used for the quantitative studies in this review was the SURE checklist for RCTs and experimental studies and consisted of 14 main questions each
with several sub questions (the full checklist is shown in Appendix A). The main questions were as follows:

1. Does the study address a clearly focused question/hypothesis?
2. Was the population randomised?
3. Was allocation to intervention or comparator groups concealed?
4. Were participants/investigators blinded to group allocation?
5. Were interventions (and comparisons) well described and appropriate?
6. Was ethical approval sought and received?
7. Was a trial protocol published?
8. Were the groups similar at the start of the trial?
9. Was the sample size sufficient?
10. Were participants properly accounted for?
11. Data analysis questions
12. Results questions
13. Is any sponsorship/conflict of interest reported?
14. Any limitations identified and consistent conclusions?

The SURE qualitative checklist was used for the one qualitative study (Appendix B) and consisted of 10 main questions (with several sub questions) as follows:

1. Does the study address a clearly focused question/hypothesis?
2. Is the choice of qualitative method appropriate?
3. Is the sampling strategy clearly described and justified?
4. Is the method of data collection well described?
5. Is the relationship between the researcher and participants explored?
6. Are ethical issues explicitly discussed?
7. Is the data analysis/interpretation process described and justified?
8. Are the findings credible?
9. Is any Sponsorship/conflict of interest reported?
10. Any limitations identified and consistent conclusions?

These checklists were chosen over others because they covered the main topics required in a critical appraisal tool of studies with varying designs, whilst enabling comparison across studies. The tool was also chosen because it does not provide an overall score for each study but instead provides a depth by means of a qualitative appraisal of each study. According to Katikireddi, Egan and Petticrew (2015) tools that give an overall score need to be used with caution as they do not clearly indicate limitations specific to that study particularly in relation to risk of bias. The results of the critique for each study are shown in table 2.

<table>
<thead>
<tr>
<th>Type of music</th>
<th>Author and year</th>
<th>Critical Appraisal using the SURE (2018) checklists</th>
</tr>
</thead>
</table>
| Live          | Keough et al. (2017) | 1. There is a research question, but it is not specific. The population is defined with a clear setting and eligibility criteria. The intervention is clearly described. There was no control group.  
2. The choice of qualitative approach is appropriate but no discussion of which method is used  
3. The selection of participants was adequately described but inclusion criteria was not detailed. No details about participant characteristics.  
4. Method of data collection not clearly described although tools were mentioned  
5. Relationship between researcher and participants not explored  
6. Ethical considerations were not clearly described, one sentence about who gave consent  
7. Data analysis and interpretation not clearly described  
8. Not clear if findings are credible due to appraisal concerns. There is not sufficient data the participant’s voices are not foregrounded  
9. No reporting of sponsorship or conflict of interest  
10. No reporting of limitations. Conclusion consistent. |
| Live          | Chu et al. (2014) | 1. Clear question with clear setting, population and eligibility criteria  
2. Yes, randomised  
3. Allocation was concealed  
4. Investigators were blinded  
5. Intervention and comparison were described  
6. Ethic approval sought and retrieved  
7. Not clear  
8. Yes groups were similar  
9. Sufficient sample size  
10. Participants were accounted for |
<table>
<thead>
<tr>
<th>Live</th>
<th>Solé et al. (2014)</th>
<th>1. Yes a clear focused research question with a clear population</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2. Not randomised</td>
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<tr>
<td></td>
<td></td>
<td>3. No concealment, convenience sampling</td>
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<td></td>
<td></td>
<td>4. See above</td>
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<td></td>
<td></td>
<td>5. Intervention was well described, there was not a control</td>
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<td></td>
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<td>6. Not mentioned</td>
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<td></td>
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<td>7. N/A</td>
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<tr>
<td></td>
<td></td>
<td>8. N/A no control</td>
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<tr>
<td></td>
<td></td>
<td>9. Small sample size</td>
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<td></td>
<td></td>
<td>10. Participants were accounted for</td>
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<tr>
<td></td>
<td></td>
<td>11. Data analysis was clearly described</td>
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<td></td>
<td></td>
<td>12. Results – all outcomes were reported on and reliable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>13. Conflict of interest/sponsor not mentioned</td>
</tr>
<tr>
<td></td>
<td></td>
<td>14. Clear limitations identified and conclusion clear</td>
</tr>
<tr>
<td>Live</td>
<td>Cooke et al. (2010)</td>
<td>1. Yes, a clear research question with a clear population</td>
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<tr>
<td></td>
<td></td>
<td>2. Yes randomised</td>
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<tr>
<td></td>
<td></td>
<td>3. Concealed allocation</td>
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<tr>
<td></td>
<td></td>
<td>4. Yes blind to allocation</td>
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<td></td>
<td></td>
<td>5. Interventions well described</td>
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<td></td>
<td></td>
<td>6. Yes, ethical approval sought and received</td>
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<td></td>
<td></td>
<td>7. Not clear</td>
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<td></td>
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<td>8. Yes</td>
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<td></td>
<td></td>
<td>9. small sample size</td>
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<td></td>
<td></td>
<td>10. Participants were accounted for</td>
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<td></td>
<td></td>
<td>11. Clear data analysis</td>
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<td></td>
<td></td>
<td>12. Clear results, outcomes reliable</td>
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<tr>
<td></td>
<td></td>
<td>13. No sponsorship or conflict of interest mentioned</td>
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<tr>
<td></td>
<td></td>
<td>14. Limitations and conclusion clearly described</td>
</tr>
<tr>
<td>Live</td>
<td>Choi et al. (2009)</td>
<td>1. Yes a clear question with a clear population</td>
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<tr>
<td></td>
<td></td>
<td>2. No, convenience sample</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. No concealment of allocation</td>
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<tr>
<td></td>
<td></td>
<td>4. No blinding</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. Intervention was well described and appropriate, control was usual care</td>
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<td></td>
<td></td>
<td>6. Ethical approval sought and approved</td>
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<tr>
<td></td>
<td></td>
<td>7. This is a trial</td>
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<td></td>
<td></td>
<td>8. Not clear how similar the groups were</td>
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<td></td>
<td></td>
<td>9. Small sample size</td>
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<td></td>
<td></td>
<td>10. Participants were accounted for</td>
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<td></td>
<td></td>
<td>11. Data analysis sufficiently described</td>
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<td></td>
<td>12. Results clear and outcomes were reliable</td>
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<td></td>
<td></td>
<td>13. No conflict of interest/sponsorship mentioned</td>
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<td></td>
<td></td>
<td>14. Limitations identified and conclusions clear</td>
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<tr>
<td>Live</td>
<td>Ledger et al. (2006)</td>
<td>1. Yes a clear focused question with a clear population</td>
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<tr>
<td></td>
<td></td>
<td>2. No, convenience sample</td>
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<tr>
<td></td>
<td></td>
<td>3. No, see above</td>
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<tr>
<td></td>
<td></td>
<td>4. No</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. Yes, interventions were well described</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6. Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7. No, N/A</td>
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<tr>
<td></td>
<td></td>
<td>8. Yes groups were similar</td>
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<tr>
<td></td>
<td></td>
<td>9. Sample size was sufficient at start (60) reduced to 45.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10. Yes participants properly accounted for</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11. Statistical methods well described</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12. All important outcomes were assessed, reliable outcome measure</td>
</tr>
</tbody>
</table>
| Live | Takahashi et al. (2006) | 1. Clear focused question, identified setting and population  
2. No randomisation, convenience sample  
3. Not clear how people were allocated to intervention  
4. Nothing was blinded  
5. Interventions were well described, control group was mentioned in one sentence  
6. Ethical considerations were clear and approval received  
7. Trial protocol not published – N/A  
8. Yes groups were similar at start  
9. Sample size was sufficient  
10. Participants were accounted for  
11. Data analysis was well described  
12. Results were clear and well described  
13. No sponsorship or conflict of interest mentioned  
14. No clear limitations, conclusion clear |
| Live | Svansdottir et al. (2006) | 1. Yes there is a clear focused question with a clear setting and eligibility criteria  
2. Yes, population was randomised  
3. Yes, single blind  
4. See above  
5. Interventions were clearly described  
6. Ethical approval sought and received  
7. No trial protocol – N/A  
8. Groups were similar at start  
9. Larger sample size  
10. Participants all accounted for and explained drop outs  
11. Statistical methods were clearly described  
12. Results clearly described and measures were reliable and validated  
13. Conflict of interest, was reported and none present  
14. No clear limitations, conclusion clear |
| Live | Suzuki et al. (2004). | 1. Yes there is a clear focused question  
2. Not clear if the allocation was randomised  
3. Not clear if allocation to intervention was concealed  
4. No  
5. Interventions were well described and appropriate  
6. No mention of ethical approval  
7. No trial protocol – N/A  
8. Not clear if groups were similar  
9. Larger sample size than previous studies  
10. Yes, participants were accounted for  
11. Statistical methods were well described  
12. Detailed results but no discussion of measures used in terms of reliability  
13. No sponsorship/conflicts of interest reports  
14. No limitations identified |
| Live | Jennings et al. (2002) | 1. Yes there is a clear focused question with a clear population however no clear inclusion/exclusion criteria  
2. No randomisation  
3. Rationale behind allocation to intervention was not clear  
4. N/A  
5. Intervention was described and appropriate  
6. No details re ethical considerations  
7. No trial  
8. No control group  
9. Small sample size  
10. Yes  
11. Statistical methods are well described  
12. Results were clearly described  
13. No discussion about reliability of tool used |
14. None reported. Some discussion of limitations and future research

| Recorded |Ho et al. (2018) | 1. Clear question, population, setting explained, not clear eligibility criteria  
2. Randomised to intervention or control but chosen to participate by a social worker  
3. Yes  
4. Social worker was not blinded  
5. Intervention was well described  
6. Ethical approval sought and received  
7. Not mentioned  
8. Yes groups were similar  
9. Sample size not sufficient according to authors  
10. Participants were all accounted for  
11. Statistical methods well described  
12. Results clearly described  
13. Outcome measures reliable  
14. No conflict of interest. Limitations clearly described and conclusion consistent |
| Recorded |Gallego et al. (2015) | 1. Yes, a clear question with clear eligibility and setting  
2. No randomisation  
3. No concealed intervention  
4. Nobody was blinded to intervention  
5. Intervention was well described but no control group  
6. Ethical approval  
7. N/A  
8. N/A  
9. Small sample  
10. All participants were accounted for  
11. Statistical methods described  
12. Results clear  
13. Not stated if outcomes reliable  
14. No conflict of interest or sponsorship. Limitations not clearly highlighted but stated within discussion and brief. Conclusion clear and matched abstract |
| Recorded |Sung et al. (2012) | 1. Clear question  
2. Yes, randomised  
3. No  
4. No  
5. Interventions well described  
6. Yes  
7. No  
8. Groups were similar  
9. Small sample size  
10. Participants were accounted for  
11. Statistical methods were well described  
12. All outcomes assessed and clearly described  
13. No conflict of interest  
14. Identified limitations, conclusion matches abstract |
| Recorded |Lin, et al. (2011) | 1. Yes a clear question, clear setting and eligibility criteria  
2. Yes randomised  
3. Not stated  
4. Not stated  
5. Interventions well described  
6. Ethical approval not reported  
7. No  
8. Groups were similar  
9. Large sample size  
10. Participants were accounted for  
11. Statistical methods well described |
Results for agitation clearly stated from the C-CMAI however no mention of the MMSE

No conflict of interest

Limitations not fully stated but conclusions clear

<table>
<thead>
<tr>
<th>Live vs recorded</th>
<th>Raglio et al. (2015)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Yes a clear question</td>
</tr>
<tr>
<td>2.</td>
<td>Yes randomised</td>
</tr>
<tr>
<td>3.</td>
<td>Not clear</td>
</tr>
<tr>
<td>4.</td>
<td>Not clear</td>
</tr>
<tr>
<td>5.</td>
<td>Interventions and comparisons were well described</td>
</tr>
<tr>
<td>6.</td>
<td>Ethical approval received</td>
</tr>
<tr>
<td>7.</td>
<td>Not stated</td>
</tr>
<tr>
<td>8.</td>
<td>Groups were similar</td>
</tr>
<tr>
<td>9.</td>
<td>Sufficient sample size</td>
</tr>
<tr>
<td>10.</td>
<td>Participants accounted for</td>
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<td>11.</td>
<td>Statistical methods clearly described</td>
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<tr>
<td>12.</td>
<td>All important outcomes were assessed</td>
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<tr>
<td>13.</td>
<td>Conflict of interest/sponsorship not mentioned</td>
</tr>
<tr>
<td>14.</td>
<td>Limitations clearly identified. Conclusion clear</td>
</tr>
</tbody>
</table>

Studies reviewed came from nine countries (Australia, China, Iceland, Italy, Japan, Spain, South Korea, Taiwan and the USA) and used a variety of mostly quantitative designs. They were conducted over a time period from 2002 to 2018 and involved a total of 742 participants with a dementia; the number of participants ranged from 10 to 120 per study. In relation to the outcomes measured three of the studies measured physiological responses and cognitive function (Chu et al., 2014; Suzuki et al., 2004; Takahashi et al., 2006), four of the studies measured anxiety (Cooke et al., 2010; Gallego et al., 2015; Sung et al., 2012; Svansdottir et al., 2006), two of the studies measured depression (Chu et al., 2014; Gallego et al., 2015), and ten of the studies measured agitation (Choi et al., 2009; Cooke et al., 2010; Gallego et al., 2015; Ho et al., 2018; Jennings et al., 2002; Ledger et al., 2006; Lin et al., 2011; Sung et al., 2012; Suzuki et al., 2004; Svansdottir et al., 2006). Three studies measured quality of life (Choi et al., 2009; Raglio et al., 2015; Sole et al., 2014). A further study (Ho et al., 2018) also measured irritability, dysphoria and the ability to sit still (aberrant motor behaviour). Quality of the research was varied, and the SURE checklists indicated that the common limitations involved the samples used, the allocation methods and the lack of or nature of the control
group. The methodological strengths and weaknesses are considered in the discussion of each study, as well as in the section ‘Methodological Considerations’ below.

**Live music**

Ten of the studies involved interventions that used live music. This section first considers the one included qualitative study. Studies with substantial methodological limitations such as convenience sampling methods are then considered. Finally, the studies with a more rigorous methodological approach, such as those using randomisation are outlined.

The most recent of these was completed by Keough et al. (2017). This study described a clinical project developed in an academic setting followed by a pilot within the community using purposive sampling. The purpose of the study was to provide a model for services. This qualitative project involved a small-group model of music therapy for people with dementia that utilised singing, drumming and movement accompanied by live instrument playing from a music therapist. Keough et al. (2017) found improvement in social, emotional, language, musical functioning and also new learning for participants in a music group. The SURE checklist indicated that there were several limitations to the study including not having a clear design or procedure for data analysis making it difficult to replicate. Although the data produced was from several checklists there did not appear to be any formal analysis of it, rather a general qualitative analysis of observations arising as a whole. The participants were chosen by the researchers and a charity thereby increasing sampling bias and together with the small sample size this reduced external validity. The researchers point out that a disadvantage to the time interval data analysis was that it did not capture brief but important behaviours that were occurring between measurement points.
All the other studies within the review used quantitative data related to cognitive function, quality of life, physiological responses and behavioural or psychological symptoms. The earliest was completed by Jennings & Vance in 2002. This study focused on the short term effects of music therapy (involving a music therapist playing familiar music and the opportunity for instrument playing) and indicated a reduction in agitation for a brief time particularly for specific behaviours (e.g. verbal disruption, wandering, and restlessness). However, there was no change to symptoms of physical agitation such as hitting or spitting. Critical appraisal of this study indicated that it had a clear focused question and described the intervention, statistical analysis and results well. However, it did not detail inclusion/exclusion criteria, had a small sample size, lacked a control group and did not refer to any ethical considerations.

Ledger and Baker (2007) also looked at the impact of group music therapy on agitation however they used a longer term focus with participants attending 42 weekly sessions over the space of a year. Participants were allocated to either a music therapy group (involving listening to live music, playing instruments and reminiscence) or a usual care control group depending on their place of residence. In their study music therapy participants showed short-term reductions in agitation but no significant differences between them and a control group in agitated behaviours over time. The researchers explained that this is likely due to substantial variations in the degree of agitation over time due to uncontrolled variables such as medication, hospitalizations and deaths of family or friends. There were also concerns that the measure used did not fully capture the level of agitation. The SURE checklist indicated that the main methodological concern was that it was not clear how the participants were selected or allocated to each condition, furthermore the researchers used convenience sampling thereby increasing the risk of bias.
Several other studies used convenience sampling within their design. Suzuki et al.’s (2004) study focused on the impact of group music therapy on behavioural and endocrinological symptoms. Participants were divided into a music therapy group (involving live music and the opportunity to play percussive instruments) or a usual care control group. They found that group music therapy significantly reduced irritability and improved scores on the MMSE ‘language’ subscale but not overall cognition. They found that salivary indicators of stress were not consistent although it was noted that levels significantly decreased just before the last session compared to after it. The researchers concluded that music therapy reduces stress and irritable behaviour. The main limitation, identified using the SURE checklist, was that there were not clear inclusion/exclusion criteria or an explanation of how participants were selected or allocated to each group therefore it is difficult to replicate and fully appraise.

Takahashi & Matsushita (2006) also employed convenience sampling but measured physiological responses and the long-term effects of group music therapy (over a time period of two years). They measured the effects of group music therapy (involving instrument playing, singing and concert participation) in comparison to a usual care control group. They claimed that group music therapy reduced systolic blood pressure and maintained physical and mental states during the two year period better than a non-music therapy group. Takahashi et al. (2006) reported that the social aspects of being in a group and interacting helped to maintain physical wellbeing and cognitive function. However, as with the previous study the SURE checklist indicated that the main methodological concern was that there was not an explanation of how the participants were selected and allocated to the intervention or any clear limitations of the study detailed.
Choi, Lee, Cheong & Lee (2009) carried out a preliminary controlled pilot study, again using convenience sampling, looking at behavioural and psychological symptoms of dementia as well as quality of life and caregiver distress. The participants were allocated to either a group music intervention (involving playing instruments along with familiar songs) or a usual care control group. Choi et al. (2009) found that participants in a music intervention group showed greater improvement in the severity of symptoms, caregiver distress and total distress and agitation scores. There was also a significant difference in quality of life scores for the participants in the music intervention group including within physical and psychological health status, social relationships, living environment, global health, and life satisfaction. Critical appraisal of this study indicated a strong section on limitations and ideas for further research. However, the limitations included the small sample size, lack of randomization and absence of appropriate controls using an equivalent intervention.

Solé, Mercadal-Brotons, Galati & De Castro (2014), also using convenience sampling, looked at the effects of group music therapy on Quality of Life (QoL), affect and participation. Participants took part in a music therapy group facilitated by a music therapist that involved playing instruments, composition/improvisation, music activities and singing along to music played by the therapist. No significant change for QoL scores were found, expressed emotions remained low and there was a decrease in interpersonal relationship measures. However, there was a positive change for emotional wellbeing and participation levels remained high according to observations. Participation was particularly increased when the participants played musical instruments. The researchers highlighted that the lack of change in QoL scores and decrease in interpersonal relationships may reflect the natural progression of dementia and they also highlighted several methodological limitations of the
study including that the participants had a range of severity of dementia and therefore it was difficult within the group to adapt to every person’s need. They reported that the small sample size and different subgroups of participants (with a range of dementias) limits the interpretability of the results. The project used existing groups of participants to reflect the ‘naturalistic setting’ therefore increasing confounding variables and they acknowledge that this has significant methodological limitations.

The convenience sampling and small sample sizes of the studies above invite caution when interpreting the results. However, there were three studies using live music that used more rigorous methodology: Svansdottir and Snaedal (2006), Cooke et al. (2010) and Chu et al. (2014). Svansdottir and Snaedal (2006), randomly allocated participants to either a music therapy (involving active and passive participation and live instruments) group or a usual care control group. They found a reduction in activity disturbances, aggressiveness and anxiety for participants in a music therapy group at four weeks, however by follow-up the effects had mostly disappeared. The BEHAVE-AD questionnaire was completed by nursing staff that were not on the same wards as the participants and were blinded to the therapy used. As indicated by the SURE checklist this study was more methodologically rigorous than the previous studies due to the sample size, reporting of inclusion criteria, ethical considerations, single blind design and randomisation. However, the sample size remained low and there was a high dropout rate.

The second study with more rigorous methodology was a randomised controlled trial (RCT) looking at the effect of group music therapy on agitation, anxiety and depression (Cooke et al., 2010). The intervention involved a live group music intervention compared to a reading control condition. The results indicated that for both groups there was an increase in verbal aggression over time and that participation in the music programme did not
significantly affect agitation and anxiety compared to the reading group. The researchers suggest this may have reflected the short-term nature of benefits within sessions: the music group may have been as equally beneficial as the reading group and that a more individualized treatment within the music group may have had more of an impact. The researchers also claim, however, that both the music and reading groups offered opportunities to improve verbalizations for people with dementia, they determined this from the increase in verbal aggression noted. The SURE checklist revealed that this study’s strengths were in it being double blinded although the sample size remained small. A limitation of the study was that agitation was rated by carers whereas anxiety was assessed through self-reporting with the RAID. If the same person had completed both agitation and anxiety measures this could have resulted in different findings.

Thirdly, Chu et al. (2014) carried out an RCT looking at the impact of group music therapy on depression, stress (indicated by salivary cortisol levels) and cognition function. Participants were randomly allocated to the intervention (listening to live music instrument playing with the opportunity for participation using instruments) or a usual care control group. Results indicated that group music therapy reduced depression and delayed cognitive deterioration in participants with mild to moderate dementia although there was no change in cortisol levels which were used as a biochemical marker for depression. They concluded that the use of musical instruments provided opportunity for the expression of emotions therefore improving the overall mood. The SURE checklist indicated that a large sample size and random allocation were particular strengths. Limitations, which were clearly identified, reduced generalisability due to a narrow sample from only three residential care settings, brief intervention length and lack of long term follow up.
GROUP MUSIC INTERVENTION AND DEMENTIA

Recorded music

Four of the studies used recorded music. The one study that employed convenience sampling will be considered first (Gallego & Garcia, 2015). The three studies with a randomised design will be considered subsequently.

Using a within-subjects design Gallego et al. (2015) looked at the effect of music therapy (involving listening to familiar recorded music with opportunities for accompaniment using percussive instruments and movement) on cognitive function, psychological and behavioural symptoms. The results indicated that there was a significant improvement in memory, orientation, depression and anxiety for mild to moderate dementia. The participants with moderate dementia also showed an improvement in hallucinations, agitation, irritability and language disorders. The SURE indicated that the study has some significant methodological limitations in that participants were chosen by the researchers and there was no comparison group.

Sung, Lee, Li and Watson (2012) used a similar sample size but offered a more rigorous study by using random allocation. Participants were allocated to either a group music intervention (involving recorded familiar music and the opportunity to use percussive instruments) or a usual control group and agitation and anxiety were measured. They found that group music intervention had a significant effect on reducing anxiety scores. There was also a significant decrease in agitation scores over time but this was not significantly different from controls. They suggest this may have been due to low levels of agitated behaviour in both groups at baseline. The authors also claim that it is a possibility that the reduction in agitation with the music intervention may have had a knock-on effect on the participants in the control group when they were socialising together outside of the sessions. The SURE checklist indicated that the main limitations were that the participants were all from one
residential care facility and that blinding of the participants or investigators was not possible. The researchers expressed concern over there being a lack of a reliable and valid standardised tool that measures anxiety and agitation and detailed several confounding variables including the impact of visitors and nursing staff and the use of medication.

Lin et al. (2011) in contrast used a larger sample size along with randomization. This study looked at the effect of group music intervention on agitation with participants allocated to either an intervention (involving a mixture of listening to specially selected music, singing and instrument accompaniment) or a usual care control group. Results indicated a decrease in agitated behaviour in general, at the mid and end point of the intervention but also at one month post intervention. Specifically, it was noted that there was a reduction in physically and verbally non-aggressive behaviours and physically aggressive behaviours. The strengths were the large sample size and the randomization. The limitations were that the participants were from residential homes in a small geographical area, reducing generalisability, and one of the outcomes was not reported on (the MMSE).

The most recent of the studies using recorded music was by Ho et al. (2018). They looked at the impact of group music intervention on behavioural and psychological symptoms such as agitation, aberrant motor behaviour, dysphoria, irritability and subjective mood. Participants were randomly allocated into either the intervention group (involving listening to recorded familiar music with the opportunity to take part using movement or instruments along with multi-sensory components) or a usual care control group. There was a significant improvement in agitation, aberrant motor behaviour and dysphoria but not irritability and subjective mood. The researchers concluded that using preferred recorded music fostered relaxation and positive mood whilst the active participation provided an opportunity for social interaction and non-verbal communication. The study was clear about its own
GROUP MUSIC INTERVENTION AND DEMENTIA

limitations – particularly that the participants were all recruited by social workers who were not blinded to the purpose of the intervention – they may have chosen those people with increased symptoms in order to help them. The SURE checklist also revealed that although the sample size was one of the largest in this review it remains small and thus reduces generalisation. In addition, only four out of the twelve neuropsychiatric symptoms on the measure used (the NPI) were evaluated and the care homes were all part of the same organisation which may have influenced the results due to a shared care culture.

Live versus recorded

One study, arguably the most methodologically rigorous in this review, specifically compared recorded and live music (Raglio et al., 2015). This study was a multicentre RCT looking at the effects of active music therapy and individualized listening to music on behavioural and psychological symptoms of dementia and quality of life. Participants were randomly allocated to either active music therapy, listening to music intervention, or a usual care control group. Active music therapy was facilitated by a music therapist who followed the participants’ rhythm and music production and used singing and improvisation. The listening to music group involved listening to recorded music from a preferred playlist on their own without any interaction with anyone else. All groups showed a significant improvement over time for behavioural and psychological symptoms and quality of life scores. Behavioural assessment did not show significant differences between the groups. An exploratory post hoc analysis showed similar within-group improvements for the NPI delusion, anxiety, and disinhibition subscales. In the music therapy group, communication and relationships between the music therapists and participants showed a positive albeit nonsignificant trend during treatment. The authors considered that the lack of a difference between intervention groups may be related to the use of the NPI as an outcome measure as it
may have missed the benefits of the active music therapy. They also claim that the number of sessions may have been too small to show a significant difference and that the high dropout rate (22 out of 120 did not complete the study) was a major limitation. The SURE checklist indicated that although benefiting from a large randomised sample size, across several institutions, it is not clear if double blinding took place nor was it evident specifically what individual symptoms were measured particularly in relation to quality of life.

Discussion

Summary of the Impact of Music Group Intervention on Specified Outcomes

In relation to the first question of this review, the studies reviewed indicate that group music interventions using active participation can impact positively on some of the behavioural and psychological symptoms experienced by people with dementia. There are also indications that group music interventions can maintain elements of cognitive function, improve aspects of quality of life, reduce stress (as measured by physiological responses) and support communication and relationship building. However, due to the range of measures used, the range of results and widespread methodological limitations caution needs to be taken when making firm conclusions about the outcomes even with the more rigorous studies reviewed.

Behavioural symptoms. Regarding behavioural symptoms, the most consistent positive impact related to agitation and irritability (Cooke et al., 2010; Gallego et al., 2015; Ho et al., 2018; Jennings et al., 2002; Ledger et al., 2006; Lin et al., 2011; Sung et al., 2012; Suzuki et al., 2004; Svansdottir et al., 2006).

Psychological symptoms. Regarding psychological symptoms the most positive impact was for anxiety and depression (Chu et al., 2014; Gallego et al., 2015; Svansdottir et al., 2006) in addition to dysphoria (Ho et al., 2018) and hallucinations (Gallego et al., 2015).

Cognitive function. The impact on cognitive function (including attention,
calculation, recall, language, ability to follow simple commands and orientation) was less conclusive with only one out of three studies (Chu et al., 2014) showing a positive impact, this may have been because of the natural deterioration to cognitive functioning for people with dementia.

**Physiological responses.** Three studies also looked at physiological outcomes, specifically cortisol levels (Suzuki et al., 2014, showed a positive impact but Chu et al., 2014, didn’t) and blood pressure (Takashi et al., 2006, showed a positive impact) and claimed that the positive results were an indication of reduced stress.

**Quality of life.** Three studies measured quality of life: Sole et al. (20014) found no significant change to scores whereas Raglio et al. (2015) and Choi et al. (2009) found positive improvements. The only study (Keough et al., 2017) that looked at more qualitative experiences found trends of a decrease in perseveration, expressions of fear/uncertainty and generalised sense of anxiety as well as improvement in social, emotional, musical functioning and new learning.

**Communication and relationships.** Several studies made mention of the impact on communicative aspects of dementia however this was as an aside to the outcomes being measured. Keough et al. (2017) and Suzuki et al. (2014) both mention a positive impact on language subscales and Raglio et al. (2015) found that communication and relationships between the music therapists and participants showed a positive albeit nonsignificant trend. Additionally, Cooke et al. (2010) refer to verbal aggression increasing due to the possibility that the music intervention improved speech and Ho et al. (2018) claimed that active participation provided an opportunity for social interaction and non-verbal communication.
Summary of the Differences between Recorded and Live Music Interventions

In relation to the second question of this review there was not a large difference between the studies using recorded compared to live music. This is likely to be associated with the methodological limitations and varied designs making it difficult to compare them directly. However, it would appear interventions using recorded music had more of a positive impact on cognitive function (specifically orientation and memory) and a consistently positive impact on behavioural and psychological symptoms (specifically depression, anxiety and aggression). This may have been due to being more methodologically rigorous than the studies using live music. Some of the studies using live music reported improvements to quality of life, communication and relationships, even if not measuring those areas specifically. These aspects were only reported on once in the studies using recorded music and this was in relation to active participation (Ho et al., 2018). This may be because live music, especially that which is personalised and improvised, is more likely to lend itself to an interactional process resulting in emotional connectedness with other people and the environment therefore supporting a more relational approach to person-centred care (McDermott, Orrell & Ridder, 2014).

Only one study (Raglio et al., 2015) compared both recorded and live music and found that there was not a difference between the two for psychological and behavioural symptoms, however they explained this may have been due to the small sample size and the measure used not being suited to the benefit of active live music i.e. communicative or interactional processes.

Methodological Considerations

The SURE checklists were used to appraise quality of each of the studies. These checklists indicated that there were several limitations that applied to most, and for some
criteria, all of the studies reviewed. These limitations form the context within which the conclusion needs to be considered.

**Sample.** There was a large variety in the locations of the studies included. This has implications for the impact of cultural aspects of societal and cultural views of dementia and whether results can be generalised to other cultures. According to Faure-Delage et al. (2012) experiences of and cultural meanings attached to dementia are not universal and can be entwined with other contextual and cultural meanings such as expectations of ageing. There was also a range of sample sizes, with many of the studies noting that this was one of the main limitations impacting on their ability to make conclusions. The smaller the sample size the more difficult it is to relate the findings to the sample population.

**Outcome measures.** There was also a large range of outcomes being measured with a variety of tools being used for the same outcome across studies. For example, the NPI and the RAID were used to measure anxiety and the GDS, Cornell Scale for Depression and HADS were used to measure depression by different studies. Although they may have measured the same outcome it is recommended that caution is applied when pooling the results about specific symptoms or skills due to the different measures used. All of them had been tested for reliability and validity, for example, according to Lai (2014) the NPI has good content validity, internal consistency, test–retest and interrater reliability and the RAID has good concurrent and criterion validity and moderate to good reliability (Shankar et al., 1999). However, the measures were not matched in relation to the depth of the symptom that they focused on. For example a general measure, such as the NPI, will only look at a general view of anxiety (consisting of seven questions around areas such as being unable to relax or showing concern about unplanned events) whereas a specific anxiety measure will use greater depth (for example the RAID measures anxiety using 18 questions across four dimensions –
worry, apprehension and vigilance, motor tension and autonomic hypersensitivity). Furthermore, it may be that the studies looking at live music were not measuring the aspects that these interventions seek to address, namely building of relationships, positive experiences and communication which may have been better suited to qualitative methodologies such as thematic analysis or grounded theory to allow for a conceptual understanding to be built around complex interactional processes.

**Allocation.** Randomisation and blinding were not always present, with most studies using convenience sampling. Although the latter is easier to do and less costly it can increase sampling and selection bias whilst reducing generalisability to the sample population.

**Control group.** Many of the studies did not include a control group and most of those that did involved a control group receiving usual care. According to Smelt et al. (2010) usual care as a control needs to be used with caution and detailed as fully as the intervention. This is due to the findings that behaviour of carers and patients can change with the knowledge of the intervention occurring even if they are not directly involved.

**Intervention.** Although not specifically asked about within the SURE checklist it is worth noting that the intervention was delivered by different people across the studies. For example, some studies used trained music therapists whilst others used research assistants or social workers who had completed music therapy certificates. The quality of the intervention may have varied greatly depending on the experience, training and methodological or theoretical focus of the person leading it.

**Clinical Implications**

When considering interventions for people with dementia this review highlights the potential benefits of group music activities involving active participation. The use of music can be seen as a non-pharmacological approach that fits in to both person-centred and
relationship-centred care. For example, when considering Kitwood’s (1997) theory of “personhood” the use of group music intervention could meet the needs of people with dementia in several different domains including include attachment, inclusion, occupation, and identity. In relation to Nolan et al.’s (2004) senses framework group music intervention can help to promote a sense of security, belonging, continuity, purpose, achievement, and significance for both people with dementia and their carers. The studies in this review give credence to this through their indication of positive outcomes but also through the reporting of benefits to communication and relationships. When planning, clinicians may want to consider the type of music used within these groups (live or recorded) and consider that studies using live music reported more quality of life, communication and relationship focused benefits. One study, Keough et al. (2017) also reported on opportunities for new learning. The implications for this are especially important as the narrative around dementia has long been one of loss and deterioration and interventions have tended to focus on reminiscence (Camic et al., 2018; Schweitzer & Bruce, 2008). In relation to service delivery Keough et al. (2017) provide a model of how to set up and run a music-based intervention and this may be useful for services to use as a starting point when trying to implement non-pharmacological interventions in response to national guidance and care pathways.

**Research Implications**

This review indicates that further research is needed with increased methodological rigour before firm conclusions can be drawn. An interesting aspect of some cited studies is that they tentatively suggest group live music has the potential to address and enhance communication in a dementia population (Cooke et al., 2010; Keough et al., 2017; Suzuki et al., 2014). Future research would build on these findings and develop the evidence base. Research has been mainly focused on behavioural, psychological and cognitive outcomes for
people with dementia rather than looking at relationships or interactional benefits of group musical intervention for people with a dementia and their carers. The results of this review highlight that research focused on the social context of people with dementia in relation to music interventions is very limited. Dementia Care Pathway (NCCMH, 2018) and NICE guidelines (2010 and 2018) have emphasised the need for relational research and interventions in dementia care.

Specifically, there is a gap in research looking at the relationship between music interventions and communication. As music is considered to build a “communication bridge” it would seem important that further research takes into consideration a more observational and qualitative perspective (Raglio et al., 2015). Video analysis may be one way of closely observing the more relational or communicative aspects, in advanced dementias in particular, by recording difficult to observe and subtle interactions, potentially adding a richness and depth to the evidence base that may be missed using static observational rating scales within quantitative designs (Griffiths and Smith, 2016).

Finally, the studies in the present review involved people with a range of dementia severity; the needs and skills of someone with mild dementia are often different from someone with severe dementia particularly in relation to verbal communication. Following their study Cooke et al. (2010) claimed that individualization of intervention for people with severe dementia is essential for meeting their needs. There is a lack of research looking at the impact of music on communication for people with severe dementia. Further research could fill this gap and focus on aspects of group music that are adaptive to people’s needs within residential care settings.
Conclusion

The results of this review highlight the potential positive use of group music interventions with active participation for people with dementia. The methodological limitations make it difficult to offer firm conclusions yet there were positive impacts on aspects of quality of life, elements of cognitive function, behavioural, psychological, physiological and communication outcomes. There did not seem to be a large difference between studies using live or recorded music although the latter were more methodologically rigorous and reported more of a consistently positive impact on behavioural and psychological outcomes. However the studies using live music reported on benefits to relationships and interactions for people with dementia that were not reported as much in the recorded music studies. The majority of the research has used quantitative measures and analysis with variable methodological rigour and results. There is a paucity of research involving group music interventions using qualitative approaches that can help to explore the experiences of people with dementia and meet the needs outlined by Kitwood’s (1997) theory of personhood and Nolan et al.’s (2004) senses framework. Such studies would be more in line with national guidelines provided by NCCMH and NICE that advocate communication, social interaction, relationship building and engagement in meaningful activities to support quality of life and psychological wellbeing for people with dementia. In response to this and due to the gap in the evidence base, further research could focus on the impact of live group music on communication using a qualitative approach.
References


Camic, P. M., Crutch, S. J., Murphy, C., Firth, N. C., Harding, E., Harrison, C. R., ... & Windle, G. (2018). Conceptualising and understanding artistic creativity in the


GROUP MUSIC INTERVENTION AND DEMENTIA


GROUP MUSIC INTERVENTION AND DEMENTIA


Section B

A multisensory communicative environment through music for people
with late stage dementia

Word Count: 7360

For submission to Wellcome Open Research
Abstract

Research has evidenced the benefit of music intervention on biological, psychological and cognitive symptoms of dementia. However, there is limited literature focusing on the impact on communication. This study allowed a conceptual understanding to be built around communication; how people with late stage dementia may express themselves non-verbally and interact with others in response to a live music group over time. In this qualitative study visual grounded theory was used to analyse data generated from eight hour-long weekly sessions (the intervention) and one hour-long recorded music listening session. It was theorized that the live music group facilitated a multisensory communicative environment allowing for verbal and non-verbal communicative actions, social interactional components and agency to develop. The developing grounded theory supports Kitwood’s (1997) theory of personhood and relational theories of dementia care. The theory has implications for dementia care, Music for Life groups and methodology of future research. Ideas for future research are suggested including a larger scale study and a widening of the location and characteristics of the sample.

Key words: dementia, communication, live music, multisensory
Introduction

Dementia is a progressive condition characterised by a deterioration in cognitive function that can have significant impact on daily life, potentially affecting memory, thinking, orientation, communication, mood, language, learning capacity and judgement (World Health Organization, WHO, 2017). According to WHO there are currently 50 million people with dementia worldwide, estimated to rise to 82 million people by 2030. Dementia represents an annual cost of approximately £26.3 billion to the UK and therefore poses an ongoing challenge to the national health service and social care (Alzheimer’s Society, 2014).

Intervention

The field of dementia care has been greatly influenced by Kitwood’s (1997) theory of ‘personhood’ which proposed that the needs of people with dementia include comfort, attachment, inclusion, occupation, and identity. Although Kitwood’s ideas have been hugely influential over time there has been a move towards more relational theories of dementia. Nolan, Davies, Brown, Keady and Nolan (2004) claim that person-centred care fails to adequately capture the reciprocity and interdependency that underlies caring relationships and that it needs to be expanded to a relationship-centred care approach underpinned by a psychosocial theory of relating they have identified as the ‘senses framework’. Within this framework, Nolan et al. (2004) suggest that all parties involved in caring need to experience relationships that promote a sense of security, belonging, continuity, purpose, achievement, and significance. Furthermore, Tresolini and the Pew-Fetzer task force (1994) recommend that the foundation of any therapeutic activity should focus on the importance of interactions amongst people. According to Henwood and Ellis (2014) dementia treatment and care has historically tended to focus on physical rather than social aspects. Traditionally, physical symptoms have been treated pharmacologically however concern has been raised about the
inappropriate use of psychoactive drugs due to their reduced efficacy and unwanted side effects (Talerico, Evans & Strumpf, 2002). According to Oliveira et al. (2015) non-pharmacological interventions (e.g. music interventions) have important and significant efficacy for improving biological, psychological and cognitive symptoms of dementia and shifting focus to more relational aspects, therefore they should be considered as a primary intervention. The recent Dementia Care Pathway produced by the National Collaborating Centre for Mental Health (NCCMH) (2018) sets out key commissioning and service development aspects focusing on diagnosis, treatment and improving post-diagnostic treatment and support for people with dementia and their carers. Both the NCCMH and NICE (QS1, 2010; QS30, 2013) recommend that treatment and support include maintaining the wellbeing of people with dementia and their carers by helping them to build relationships and engage in meaningful activities.

**Communication and dementia**

According to Ridder and Gummesen (2015) people with dementia, particularly those that may have difficulty with verbal communication, may be at increased risk of social isolation and perceived as non-communicative or even not existing. Social bonding is built upon communication and it is not just a linguistic message that is exchanged within an interaction but also the equally important paralinguistic and non-verbal messages (Ridder, 2003). Paralinguistic aspects of communication involve the way in which speech sounds are said and include timing, intonation, pitch, volume, tempo and prosody: the latter has been referred to as “communicative musicality” (Malloch, 1999). Communicative interactions are highly complex, whether verbal or non-verbal, and as well as containing messages also involve turn taking, timing and flow. Gesture, prosody and exaggerated expression offer the cues within an interaction that help turn-taking take place for people with severe
communication difficulties (Holck, 2004) and therefore are the essential building blocks to creating a relationship.

A recognition of the impact of social isolation on people with dementia has resulted in the development of several communication techniques that are aimed at reducing social isolation through focusing on paralinguistic and non-verbal aspects. An example of this is “adaptive interaction” (Ellis & Astell, 2017), a technique used with people with dementia who communicate nonverbally. Adaptive interaction is based on “intensive interaction” (Nind & Hewitt, 2012) and as a central component it uses the process of “mirroring”, where any communication attempts are reflected back to the person initiating them in order to bridge communication difficulties (Henwood and Ellis, 2014).

**Music and dementia**

Pace, Treloar and Scott (2011) claim that music can facilitate mirroring and has been shown to offer a fundamental, emotion-based connection. Music can be seen as similar to spoken language with regards to pitch and phrasing and when improvisation is used it creates a dialogue that becomes a musical conversation that relies upon the paralinguistic and non-verbal nature of the interaction (Wigram, 2012). Music intervention has also been found to decrease stress hormones (Spintge, 2000), increase relaxation and emotional wellbeing (Brotons & Koger, 2000), provide a sense of safety and reduce anxiety (van der Steen et al., 2018). Other research has shown that singing groups can enhance a sense of equality for people with dementia and their carers (Unadkat, Camic & Vella-Burrows, 2017) and that regular musical activities can have long-term cognitive, emotional, and social benefits for people with mild/moderate dementia (Sarkamo et al., 2013).

Group music intervention, specifically, can help prevent social isolation by encouraging social interaction and encourage communication of feelings and ideas (Aldridge,
1996). According to van der Steen (2018) group music intervention provides opportunities to make connections with other people through non-verbal musical communication which may help people cope with their illness and build relationships. Furthermore, McDermott, Orrell & Ridder (2014) suggest that meaningful musical group experiences result in emotional connectedness with other people and the environment which would appear to support a more relational-approach to person-centred care. Most of the studies looking at group music intervention have focused on measuring biological, psychological and cognitive symptoms using quantitative analysis rather than looking at relational or communicative aspects. Studies that mention these latter aspects tend to be ones that have used live rather than recorded music as an intervention. Although there is a limited evidence base for the benefit of live music compared to recorded music it may be that the measures that have been used do not capture the more relational or communicative benefits that might exist with live versus recorded music.

**Video analysis**

Several studies looking at the impact of music for people with dementia and carers have used video analysis (e.g. Ragneskog, Asplund, Kihlgren & Norberg, 2001; Engström, Hammar, Williams & Gotell, 2011). Many of these studies have used quantitative measures to analyse video data but there have been no studies, found to date, that sought to develop a theoretical understanding of communication using video analysis. According to Konecki (2011) visual grounded theory can be used to generate theories, construct categories, and describe properties which account for a visual social process. Griffiths (2013) and Griffiths and Smith (2016) used visual grounded theory methodology with people with severe and complex learning disabilities and concluded that it has the potential to reveal and explain patterns of non-verbal interactions that would not have previously been revealed.
Aims

This project investigated a live music group based on the Music for Life (Rose, 1993) approach, which uniquely brings together professional musicians, care staff and people living with dementia through interactive music sessions aiming to enhance quality of life. Cooke et al. (2010) highlight the importance of individualizing interventions and therefore this study looked at live music facilitated by musicians using improvisation to interact with each group participant. The proposed study will allow a conceptual understanding to be built around communication that will enable us to theorize how people with dementia may express themselves non-verbally in response to music, and in relation to the other members of the group over time.

Specifically, the project aimed to answer the following questions:

1. What is the nature and range of communicative interactions within the group between people with dementia, carers and musicians?
2. What part does the live music have to play in relation to the communicative interactions?
3. How does communication change over the course of the group sessions?

Method

Design

This study employed a qualitative, longitudinal design influenced by classic grounded theory (CGT) (Glaser & Strauss, 1967; Glaser, 1998) and video analysis as established by Griffiths (2013). A qualitative design was used as this seemed most appropriate for exploring the depth, complexity and subtleness of the data. It was an observational study that gathered qualitative data from video recordings to develop a conceptual understanding of communication for people with dementia within a specific type of music intervention (Music
According to Griffiths and Smith (2016) the use of visual CGT provides a way of eliciting meaning from people who express themselves primarily using non-verbal means as it allows for careful observation of subtle or nuanced communication. Classic grounded theory was used over other qualitative methods as it supports the development of a theoretical understanding grounded in social experiences (Urquhart, 2013).

**Epistemological position.** Glaser & Strauss (1967) claimed that grounded theory is a method and as such does not belong to a set epistemological approach. However, this has been a long-debated issue. According to Oliver (2011) critical realist grounded theory addresses both the event itself and the meanings made of it, as well as honouring both theory and practice, individual agency and social structure; the latter two are often overlooked in advanced dementia care practice and research.

**Participants**

The participants with advanced dementia included eight adults who lived in the same residential care home (Table 3). Additional participants were staff members from the care home (three to five per session) and professional musicians (three each session) trained in the Music for Life intervention.

<table>
<thead>
<tr>
<th>Participant</th>
<th>Gender</th>
<th>Age</th>
<th>Type of dementia</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Female</td>
<td>97</td>
<td>Atypical or mixed</td>
</tr>
<tr>
<td>2</td>
<td>Female</td>
<td>93</td>
<td>Alzheimer’s</td>
</tr>
<tr>
<td>3</td>
<td>Male</td>
<td>92</td>
<td>Mixed – Alzheimer’s and vascular</td>
</tr>
<tr>
<td>4</td>
<td>Male</td>
<td>92</td>
<td>Alzheimer’s</td>
</tr>
<tr>
<td>5</td>
<td>Male</td>
<td>92</td>
<td>Alzheimer’s</td>
</tr>
<tr>
<td>6</td>
<td>Female</td>
<td>82</td>
<td>Unknown</td>
</tr>
</tbody>
</table>
Table 1 — Group Music Intervention and Dementia

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>85</th>
<th>Alzheimer’s</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Female</td>
<td>88</td>
<td>Vascular dementia</td>
</tr>
</tbody>
</table>

Procedure

**Ethical considerations and consent.** An ethics panel at Canterbury Christ Church University granted ethical approval for this study (Appendix C). Consent needed to be considered in relation to the Mental Capacity Act (MCA; Department of Health, 2005). Participants had an advanced stage of dementia and did not have the capacity to give consent. Their legal family guardians, acting as “consultees”, were asked to provide consent as advised by the MCA. Consent had already been separately gained from the consultees regarding participation in the Music for Life group by the care home. Therefore, consent for this study was requested, not to participate in the group, but for consent to video record the group, undertake relevant analyses and to publish findings. Each consultee was provided with a participant information sheet and a consent form (both shown in Appendix D). The British Psychological Society’s Code of Ethics (2009) was followed throughout the research.

**Data collection.** Video data consisted of one recorded music listening session (used as a “negative case”) followed by eight, hour-long weekly sessions (the intervention). All were recorded using the Fly 360-degree camera® and analysed by NVivo 11 software (version 11.3.0.773; QSR International, 2016), which allowed ‘slowed-down’ video analysis (e.g. 0.25 seconds per frame) to be captured. The intervention is described in Appendix E. The 360-degree camera allowed a continuous view of all participants to better capture and understand interpersonal interactions. Video data was recorded each week and downloaded onto a password protected and encrypted file by the lead musician and lead consultant on this project.
**Data analysis.** As in Griffiths and Smith’s (2016) study video was the primary data-gathering tool. All interactional data was used, that is, all verbal interactions, non-verbal interactions, observable behaviours and the sequence of interactions. Data from all sessions were downloaded using the Fly 360 Director software, which enabled footage to be viewed from a 360-degree perspective. This facilitated close observations of simultaneous activity across the group at any given moment as well as easily accessible forward and rewind abilities, thus aiding detailed description throughout.

To begin the data analysis, four residents were chosen at random from initial observations of the first live music session. They were observed across five of the eight live music sessions and the recorded music session for the whole of each session (recorded music session, sessions one, three, five and seven). Theoretical sampling was used by which the initial data from these observations helped to decide where to continue sampling (Urquhart, 2013). Further observation was completed with the other four residents to test the initial concepts being identified. These latter four residents were not observed for the whole of each of the five sessions. Instead, samples were taken from each session at time periods when the previously observed participants had all shown a significant change in communicative actions.

The process of data analysis followed that described by Griffiths and Smith (2016). They pioneered their approach of visual grounded theory in order to elicit meaning and better understand social interactions for people with severe learning disabilities who relied on non-verbal communication. This helped to uncover “talk” that did not rely on words. The same approach was used for this study. A transcription was made of moment-by-moment participant observations: what they were doing, what was happening around them (including the music), as well as what preceded and followed the moment. A sample of one of the
transcripts is shown in Appendix F. Once a narrative transcript was made for each of the initial participants the next step was to code them. NVivo-11 was used to assist in this process. This initial or open coding involved constant comparison; once the first code was identified it was compared to the next piece of data in order to see whether they were similar, and could be incorporated together, or whether a new code needed to be named. The codes generated from this initial process are shown in Appendix G (examples included singing along, dance like music, facial passivity, smiling). A process of selective coding then occurred where the codes were grouped together into core categories, depending on whether they shared similar properties. Throughout coding theoretical memos (Appendix H) were written to help identify emerging relationships and conceptual categories. The process of coding involved an ongoing shaping and reshaping of the core categories, which contributed to theoretical development as additional data were coded in an iterative cycle. The aim of the analysis was to reach theoretical sufficiency whereby a sufficient depth of understanding is obtained to allow for a plausible theory to develop (Dey, 1999). To achieve this, following the initial data analysis, as discussed above, four further residents were observed across five live music sessions. The coding process was repeated for the additional data, allowing for definition and clarification of categories and further conceptual understanding. Several variations of the emerging theory were developed and adapted as constant comparison took place prior to their consolidation (earlier versions can be seen in Appendix I). Once analysis was completed, using theoretical sampling a “negative case” (Allen, 2017) was chosen; a session where only recorded music was played, in order to further refine the theory.

**Quality assurance.** Several methods of quality assurance were used in order to monitor and reflect on the researcher’s preconceptions and motivations and the potential impact of this on the data analysis. A reflective research diary was completed throughout
(Appendix J). The lead research supervisor examined and discussed examples of coding and corresponding sections of video were reviewed, discussed and agreed along with the emerging theory. Finally, Chiovitti and Piran’s (2003) guidelines for grounded theory quality assurance were followed (Appendix K).

**Results**

The goal of grounded theory is to identify a core or overarching category that brings together the key aspects of the analysis (Griffiths & Smith, 2016). For this study, music making was seen as a facilitator and as a way to communicate in later stage dementias. The essential overarching aspect of the music making groups appeared anchored in multiple communicative actions that occurred between musicians and residents, musicians and staff, and residents and staff. These were not linear forms of communicating with a clear beginning and end but were often a network of complex and subtle interactions discovered through close observation. The process that operated to form the core category of these multiple types of communication is a multi-sensory mechanism created by the music making groups. The multi-sensory nature of the mechanism provided a unique and supportive communicative environment.

**A multisensory communicative environment through music for people with late stage dementia**

The emerging grounded theory is composed of three interacting components: multiple communicative actions, social interactional components and agency. Multiple communicative actions act as the core category because they included most of the data (Glaser, 1998). The careful, sensitive noticing of and responding to the communicative actions by the musicians set the foundation for the social interactional components of communication (mirroring, turn taking and humour) and agency to take place. Once established, all three components
interacted with each other. The unique multisensory mechanism that was fundamental to this intervention supported the development and maintenance of all three components (Figure 2).

**Figure 2.** A multisensory communicative environment through music for people with late stage dementia

**Structure of the grounded theory**

**Multiple communicative actions.** The data consisted of all observable behaviour of the participants across the music sessions. The data were coded and categorised into ten
communicative actions: laughing, body positioning, playing an instrument, looking, pointing, dance-like movement, talking, facial movement, smiling and singing. A full description of each of the communicative actions and the codes within them is shown in table 4. Each action involved a level of physicality, in that they involved movement of all or certain parts of the body and contained either non-verbal or verbal components. They formed the core category of communicative actions because, as theorised by Argyle (1988), any verbal or non-verbal behaviour that has the potential to influence another individual, intentionally or not, can be seen as communicative. Within the groups it seemed that each of these actions had the ability to influence the behaviour of the musicians or staff and therefore moved from being solely a physical action to a communicative action. They included behaviour on a spectrum of subtlety from direction of looking to verbal expression. These communicative actions formed the basis of the grounded theory because they involved everyone who participated in the groups and therefore appeared to be the foundation.

Table 4  Multiple communicative actions and codes

<table>
<thead>
<tr>
<th>Category: multiple communicative actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subcategories</td>
</tr>
<tr>
<td>Talking</td>
</tr>
<tr>
<td>Smiling</td>
</tr>
<tr>
<td>Action</td>
</tr>
<tr>
<td>--------</td>
</tr>
<tr>
<td>Around them at the time as described above</td>
</tr>
</tbody>
</table>

**Singing**

- Residents singing along to songs that appeared familiar, singing to another person and singing with other people. This was considered communicative because it involved other people, eye contact and the potential to influence other people’s behaviour (e.g. the musician singing back or smiling in response).
- Singing to self.
- Singing in response to own name being sung.
- Singing along to welcome song, singing more words each week, singing louder each week and not covering mouth whilst singing by the last session.
- Singing along with musicians and staff.
- Singing to musician.

**Pointing**

- Residents pointing, what they were pointing at, whether they were also looking at another person to direct their attention and what was happening around them at the time.
- Pointing to a person talking, an instrument, other people in the room.
- Turning to look at person next to them and then pointing to another person or an instrument; person responds with eye contact.
<table>
<thead>
<tr>
<th><strong>Playing an instrument</strong></th>
<th>A resident playing an instrument by themselves, during music, with support from someone else. Included playing an instrument and musicians responding to sounds created with their own instruments. This was seen as communicative because it influenced the behaviour of the people around the person and allowed for creative activity (Camic et al., 2018).</th>
<th>Playing an instrument in response to gentle music, to lively music, music with an increased tempo. Playing an instrument with support of staff (encouragement such as giving them an instrument, demonstrating how to play it or staff physically supporting playing of instruments)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Looking</strong></td>
<td>Observations of where the residents were looking towards and what was happening around them. This was considered communicative because it led to a change in behaviour from staff or musicians (e.g. if a resident spent a long time staring down at their clothes the carer might try to engage them with an instrument).</td>
<td>Looking at others talking</td>
</tr>
<tr>
<td></td>
<td>Looking at other people during recorded music or live music</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Looking towards movement, at instruments, at musicians</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Looking at musicians and instruments being played</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Recorded music: looking at clothes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gentle music: looking around room</td>
<td></td>
</tr>
<tr>
<td></td>
<td>No music: looking at instruments not being played</td>
<td></td>
</tr>
</tbody>
</table>
Laughing

The residents laughed at what was happening around them at the time. These were considered communicative because they led to a response from other people and other communicative actions to follow (e.g. talking, eye contact, smiling).

Laughing response to: a carer; during 1:1 interaction; in response to an action from someone else; in response to a joke from another person. Making a joke leading to laughter from other people.

Facial movement

Observations of parts of the residents’ face moving and what was happening around them at the time, including changes to the music that corresponded with the movement.

Actions included were visible facial muscle tension or relaxation (of the jaw and cheeks and any noticeable frowning), whether eyes were open or shut and eyebrow movement. These were considered communicative because they often influenced the actions of the staff and the musicians (e.g. if a person was seated with their eyes shut a musician focused their 1:1 attention on them).

Raised eye brows in response to eye contact and smiling from carer.

Facial tension whilst playing an instrument, during increased tempo and lively music.

Relaxed face during gentle music (with slowed down tempo) and when with a relaxed body position.

Eyes opening wide whilst playing an instrument or other people playing.

Eyes opening during up tempo music having been shut during slower music.

Eyes shut.

Dance-like movement

Residents moving in time to the music. These were considered communicative because they influenced the actions of the people around them and in turn were influenced by the environment and people around them.

Legs moving in time to the music as though doing dance steps to up tempo and lively music.

Hands or arms moving in the air in time to the music.

Waving an instrument in time to the music.
Hand and arms swaying during the welcome song each session
Moving body in response to carer dancing and looking at the resident.
Swaying side to side in response to carer next to them looking at them and doing the same.

| Body positioning | How the resident was seated and any non-specific body movement during the group and what was happening around them at the time. Body positioning included hand positioning, torso and head angle. These were considered communicative because they were in response to the character of the music in particular and if noticed by the musicians or staff had the potential to influence their interactions with the resident (e.g. the resident sat upright and leaning forward whilst playing an instrument and the musician then mirroring the shaking action). | Upright and alert during music (particularly during up tempo music). Sitting back and still (particularly during recorded and slower gentle music). Looking down. Leaning towards carer. Head resting in hands. Mouth covered whilst singing and becoming uncovered over time during welcome song. Leaning back and forth during music. Hands in lap (during all types of music and no music). Fidgeting during recorded music (lots of little movement and changes to positioning). |

**Noticing and responding.** If a communicative action by a resident was noticed it could be responded to by a musician, other resident or staff member. A communicative action being responded to often led to occurrences of other communicative actions, for example,
laughter from a resident leading to laughter from a carer, smiling at each other and eye contact.

If the communicative actions were not noticed and responded to by the musicians there would be missed opportunities to build on the social interactional components and therefore less opportunity for agency for the residents. There were times when the communicative actions were not noticed, for example if the musicians were focusing on a different resident; it was observed that at these times the residents tended to cease the communication attempt or turn their attention to objects around them such as their instrument or their clothes. For example, an interaction with Anne in session seven was observed as follows:

*Staff member turned away, [Anne] sitting stiller, looking at baton, looking towards staff member, smiling at her [staff member still turned away] looking down.*

Noticing and responding to both verbal and non-verbal methods of communication, were essential because they allowed for the second component of the theory to develop.

**Social interactional components.** A full description and codes of each of these aspects are in table 5.

**Mirroring.** The noticing and responding to the communicative actions allowed for mirroring and turn taking to occur with the musicians modelling these processes within their collaborative music making. Mirroring is defined here as a communicative action reflected back to the person that initiated it (Henwood & Ellis, 2015). The musicians used mirroring as part of their practice be it through body positioning, vocalising or through the use of their instruments. For example:

*Jim, session five: given wood block by person sat next to him, he starts to tap it and musician starts to play the drum mirroring the rhythm.*
Jane, session seven: *musician holding an instrument with Jane and she starts making mouth movements, possibly vocalising, musician mirrors facial expression and mouth movements back to Jane with vocalisations matching her attempts to make sounds*

There were also examples of the residents using mirroring:

Sally, session three: *Leaning towards musician leaning forward*

Anne, session seven: *Staff member moving her arms in a dance like movement next to her, Anne starts moving the hand holding the baton mid-air in a dance like movement.*

**Turn taking.** Turn taking in this study related to a non-verbal or verbal back and forth exchange between two people. Mirroring entered into this process as a way of initiating and prolonging an interaction. Turn taking was enabled by the processes of noticing and responding to the multiple types of communication. The musicians would often use their instruments to start a turn taking exchange in response to the resident playing an instrument. For example:

Tom, Session seven: *Tom hits xylophone - each bar in order. Musician responds by mirroring notes and rhythm of this with oboe, Tom then hits the bars again and the musician responds, turn taking exchange continues.*

Mark, session five: *Beginning song – smiling at musician and swinging foot – harp playing. Both singing to each other back and forth.*

Harry, session seven: *music stops, tapping fingers in rhythm on drum in silence whilst smiling and sticks tongue out at musician. Takes it in turn with musician to imitate each other’s drumming. Smiling and eye contact with musician. Lifts up hands when had enough as in ‘I’m beaten’ and smiles – everyone laughs.*

These examples also contained elements of mirroring such as matching the volume of the sound created or singing a similar melody. Both mirroring and turn taking processes
require a negotiation by both communication partners and a careful noticing, inviting or stepping back in response to subtle cues.

**Humour.** Humour was seen as a social interaction because it required more than one individual and relied upon another person noticing and responding to its use. It involved a complex cognitive process: gaining other people’s attention, deciding what to say or do and carrying this out with the intention of making others laugh. This humour was evident in both verbal and non-verbal behaviours and often had a playful aspect to it. Harry used humour on several occasions, utilising both verbal and non-verbal means, a particular incident was during the welcome song of session five and the following occurred:

When staff member sang his name – eyebrows raised, eyes widened and said ‘who me’ whilst pointing at himself, people laughed, he smiled and laughed and jokily looked inside his jacket for someone else and then looks at musician. Then when his name is sung again……..he turns to staff member with a warm smile and says ‘merci’ then pretends to look into his jacket again and glancing at musician and smiling. Musician looks at him and he jokes again by looking inside his jacket.

This observation identified the use of humour to good effect as well as a clear turn-taking sequence using both verbal and non-verbal types of communication. The use of these social interactional components often led to other communicative actions occurring meaning that there were then increased opportunities for the musicians to respond to the residents and build upon the interaction further.
Table 5 *Social interactional components*

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Description</th>
<th>Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mirroring</td>
<td>A communicative action reflected back to the person that initiated them</td>
<td>Mirroring the type of instrument, how the instrument is being held,</td>
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<tr>
<td></td>
<td>(Henwood &amp; Ellis, 2015).</td>
<td>the sound being created (e.g. the tempo) and the character or the</td>
</tr>
<tr>
<td></td>
<td>The mirroring might be done by a resident, carer or musician.</td>
<td>number of beats.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mirroring facial movement (e.g. smiling or eye contact), singing,</td>
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<tr>
<td></td>
<td></td>
<td>body positioning or movement (e.g. leaning forward when someone else</td>
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<tr>
<td></td>
<td></td>
<td>does).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mirroring dance-like movements.</td>
</tr>
<tr>
<td>Turn taking</td>
<td>A back and forth interaction between the residents and the musicians or</td>
<td>Turn taking of spoken words, of singing, whilst playing instruments</td>
</tr>
<tr>
<td></td>
<td>staff.</td>
<td>and during dance-like movement.</td>
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<tr>
<td></td>
<td>This may develop from the use of mirroring or from the musicians, staff or</td>
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<tr>
<td></td>
<td>residents responding to one of the communicative actions and that in turn</td>
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<tr>
<td></td>
<td>being responded to.</td>
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</tr>
<tr>
<td>Humour</td>
<td>The use of what appeared to be playful communicative actions that led to</td>
<td>Telling a joke using words when their own name was sung in the</td>
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<tr>
<td></td>
<td>other people laughing.</td>
<td>welcome song.</td>
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<tr>
<td></td>
<td></td>
<td>Using gesture to make people laugh.</td>
</tr>
</tbody>
</table>
Humour was considered a social interaction because during these groups it involved other people responding to it and therefore was seen as a specific form of turn taking that was important in its own right due to the inclusion of other people in response to it (laughing).

Playing an instrument in an increasingly faster or complicated beat that was trying to be mirrored by the musician and smiling whilst doing so.

Verbally responding to sneezes and the group members laugh.

Laughing together following a turn taking exchange with the instruments.

Laughing whilst directing the musician who was mirroring body movement with an instrument.

**Agency.** According to Boyle (2014) agency is ‘the ability to initiate social action or at least influence own personal circumstances’ and can be indicated by both behaviour and emotion. A full description and codes identified as relating to agency are shown in table 6. Agency was evident throughout the group through the residents having the opportunity to choose how to participate but also through the opportunity to influence the music being created. The musicians were essential to the development of agency through their noticing and responding to the communicative actions of the residents, providing opportunity for social interaction through mirroring and turn taking as well as inviting the residents to participate in and influence the music being made. As a result, the residents could choose how they interacted with the group and the individuals within it. Participating in the group did not rely on a person playing an instrument and several of the residents chose to interact in other ways as shown by the range of communicative actions observed. For example, Mark
spent time with his eyes shut, however, small changes to his facial musculature and his eyes flitting between being open and closed indicated he was not asleep, as shown in session one:

_Eyes shut whilst instruments are handed out. Lively music – brisk with oboe – eyes open and mouth less slack. Watching musician across the room introducing an instrument to a resident. Percussion comes in. Eyes shut but mouth tight._

Some of the residents showed agency via how they wanted to interact by choosing to hand back or put down an instrument, for example:

_Harry, session three: handed an instrument by musician, they are talking about it and he is turning it over then he hands it back to musician. She returns it to him and points to show another musician demonstrating it. He hands it back to her._

_Penny, session five: She is shown a tambourine by a musician who demonstrates it to her and holds it out for her, she does not reach to take it._

_Jim, session seven: handed back the wooden block and instead started tapping his hands on his chair arms in time._

At other times residents were able to show their agency in the groups by influencing the creation of the music. The residents were given the opportunity to direct the music by the musicians responding to their communicative actions or inviting them to create a sound through the offer of an instrument, verbal encouragement, demonstration or mirroring. This was shown by the examples of turn taking and also in the following observations:

_Tom, session five: Tom starts hitting a wooden block with a mallet, the musician joins in gently tapping the drum and mirroring the rhythm Tom is playing. The flute joins in following this rhythm. Other residents start playing instruments in time or tapping in time. Tom stops and the music stops. There is talking and then Tom is invited to start playing again, he does so, and the musicians follow his rhythm again._
Harry, session five: Musician plays djembe drum and Harry responds, slight smile and eye contact, good timing and skilled response. Turn taking. Smiling, eye contact. Quiet drumming – musician responds with quiet drumming. Harp joins in gently, both start getting bolder and louder, Harry smiling, playing louder, more confident.

Table 6 Agency

<table>
<thead>
<tr>
<th>Description</th>
<th>Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>The ability of the residents to influence social action or personal circumstances through the use of behaviour.</td>
<td>Being able to sit in the group with eyes shut.</td>
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<tr>
<td></td>
<td>Choosing to sing along or sit in silence, to take an instrument and/or to hand it back.</td>
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<tr>
<td></td>
<td>Declining an instrument.</td>
</tr>
<tr>
<td>The choice of how to participate.</td>
<td>Putting down an instrument.</td>
</tr>
<tr>
<td>The choice of influencing the music.</td>
<td>Initiating creating a sound and it being followed by the musicians or mirrored back.</td>
</tr>
<tr>
<td></td>
<td>Choosing to create a sound.</td>
</tr>
<tr>
<td></td>
<td>Turn taking with instruments and the musicians following the residents lead.</td>
</tr>
<tr>
<td></td>
<td>The musicians responding to the communicative actions and a social interaction occurring.</td>
</tr>
<tr>
<td></td>
<td>Choosing how to interact with the musicians, staff or music (e.g. through verbal or non-verbal means).</td>
</tr>
<tr>
<td></td>
<td>Choice to respond to individuals or to the group.</td>
</tr>
</tbody>
</table>

**Multisensory mechanism.** An overarching mechanism that supported the three components above was the multisensory nature of the sessions. It was multisensory in the sense that it contained visual, auditory, physical and tactile components. For example, the
instruments could be seen, heard and touched; everyone was seated in a way that allowed them to see, hear and potentially physically interact each other (e.g. see facial expressions, see body movements, see and hear laughter and spoken words) and the instruments could be seen, heard and held. The multisensory mechanism was important for the resident’s communicative actions because it reinforced that the group accepted and responded to a variety of different means of communication that relied upon the use of different senses. For example, playing an instrument involved tactile components through holding it, visual components through seeing the instrument being played and auditory components through the sound created. The multisensory mechanism was important because it allowed social interactions to occur, as well as the opportunity for agency, using a variety of communicative actions. It gave the residents the opportunity to make use of and interact in ways that appealed to a variety of senses rather than relying on just one sense.

Within this multisensory mechanism there were several factors that influenced the three main components of the theory: time, one-to-one interaction and the characteristics of the music.

*Time.* Time related to experiencing the multisensory nature of the group on a weekly basis, particularly those aspects of the group that were repeated or similar every week: the music at the beginning as the group is settling in, the welcome song and the music at the end. The familiar melodies used may have orientated the residents to the purpose of the group or acted as a reminder of what happens and how they can participate leading to a change in observed communicative actions over time. This change indicated that some of the residents had remembered parts of the routine aspects of the group; the welcome song in particular. They indicated this by singing along to the words or using more exaggerated movements in each successive session. For example, Jane in sessions one and seven:
Session one during welcome song: *sat with eyes shut, mouth open and sitting back.*

Session seven during welcome song: *sitting back, eyes wide open, mouthing along to the chorus whilst looking at the musician.*

There was also a change over time for Harry during the welcome song, during the first session he sat with his hand over his mouth watching the musicians. As each session passed Harry uncovered his mouth a little more until by the seventh session he was *singing along with his hands in his lap.* This indicated that Harry had learnt that the welcome song involved specific music, words and a routine.

**One-to-one interaction.** This aspect related to the residents having time where they were receiving direct attention from another individual (e.g. a carer or a musician). The one-to-one interactions in the group were multisensory in nature involving physical closeness, eye contact, clearly visible facial expression, playing of instruments, touch and spoken words. These interactions seemed to lead to changes in communicative actions for all of the residents. For example:

Anne, session seven: *music has stopped and talking, Anne has been looking down at instruments for a while, torso still, foot tapping. Musician looking at and moving to be in front of Anne. Anne looks up. Given a drum, Anne says ‘yes’ to musician asking, ‘shall we play together?’ Anne starts hitting the drum quickly and loudly, smiling, muscles tense. ‘too loud?’ she says, ‘I don’t know?’ frowning, musician plays the djembe drum following her rhythm – she sits back a bit and keeps hitting it. Smiling. Harp joins in, she starts playing quicker. Musician sings her name next to her, she suddenly looks up and smiles at her.*
There were many instances of these changes but there were also a couple of occasions where a decrease in communicative actions was observed when the person giving the attention turned away:

Jane, session five: *Musician has turned to face Jane, sat next to her, sings her name and holds her hand. She turns to face musician, makes eye contact and smiles. Musician turns away and Jane shuts her eyes and smile fades.*

Sally, session three: *On her own – stops smiling, watching staff member, smiles at them as they walk past. Sitting back, staff member comes over, talking to her and smiling, leaning forward, laughing. Continues to shake in time, smiling, eye contact, looking up, legs moving back and forth.*

**Characteristics of the music.** Characteristics of the music related to the tempo, character and type of instrument used to create the music at a set moment. Tempo refers to the speed of the music whilst character refers to the nature of the music, for example, whether the music was gentle, brisk, smooth flowing or lively or a combination of these. The type of instrument refers specifically to which instrument was playing the predominant notes or which instrument seemed to lead to changes in communicative actions when it joined in the music. The instruments used by the musicians and provided for the residents are shown in table 7.

<table>
<thead>
<tr>
<th>Table 7 Instruments</th>
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</thead>
<tbody>
<tr>
<td><strong>Used by the musicians only</strong></td>
</tr>
<tr>
<td>Flute</td>
</tr>
<tr>
<td>Harp</td>
</tr>
<tr>
<td>Oboe</td>
</tr>
<tr>
<td>Djembe drum</td>
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<tr>
<td>Small drum</td>
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</table>
A larger drum, known as a djembe drum, in particular seemed to lead to a change in communicative action for most of the residents.

The character of the music was multisensory in nature because it could be heard but also seen through the body movement and facial expression of other people in the room. When the tempo, character and type of instrument interacted in certain ways it seemed to produce more changes in communicative action than at other times, specifically when the tempo was fast, and the character was lively at the same time as the djembe drum being played. For example:

Mark, session five: eyes drooping, minimal music in the room. Passing instrument back to member of staff. Music gentle. Watching flute player. Increase in tempo and music becomes lively – offered instrument does not take it but smiles and laughs. Djembe drum next to him starts being hit. Some nodding, starts to drum on legs in time as music picks up speed. Given shaker, starts tapping it on head in time

Jane, session five: Jane is sat with her eyes closed, music is building through different instruments joining in, tempo increases, lively and brisk, flute playing predominant notes, djembe drum joins along with other percussion in the room (other resident playing a
tambourine), Jane opens her eyes and looks at musicians, keeps her eyes open, looks at resident playing tambourine.

Sally, session 7: small drum starting, glancing up and foot starting to move more. Head still upright and mouth relaxed. Looking across to drum. Djembe drum starts, shaker starts, fast tempo. Looking at instrument, feet starting to move in time to the drum but continuing to look down. Foot moving in time. Eyes down or shut, mouth relaxed. Foot tapping in time. Fiddling with instrument, eyes still shut, and head tilted back slightly. Lifting shaker up in one hand and moving it in a dance like movement, eyes open, singing and drumming and harp.

A negative case

According to Allen (2017) negative case analysis can be used to strengthen qualitative rigor and allow for nuanced analysis. In this study a session involving the same participants but listening to recorded music, was analysed following the method described above. This played an important part in the theory’s development because the observations during this session did not seem to fit the developing theory. In relation to the multiple communicative actions it was notable that there were fewer observations for most of the subcategories except for ‘talking’ which increased. For example, one resident (Anne) spent most of the session talking aloud. In addition, there were fewer observations of mirroring, turn taking or humour. In contrast to the live music, some residents tried to stand up as though to leave the room, which may have been a way of showing agency by choosing to leave or demonstrating disinterest. With these observations in mind, this theory proposes that the live music carried a unique quality to by involving a multisensory communication environment.
Summary

The intervention created a multisensory communicative environment that allowed for multiple communicative actions to occur. The musicians used careful noticing to respond to these communicative actions leading to social interactional processes namely mirroring, turn taking and humour. As a result of these processes the residents were given the opportunity to experience and exercise their agency. The multi-sensory mechanism, (developed by the musicians and fundamental to the sessions) contained, encouraged and supported all three of these aspects leading to a unique communicative environment.

Discussion

This study sought to develop a theoretical understanding of communication within a specific group intervention, Music for Life, for people with advanced dementias. In doing so it attempted to understand the ways people with dementias communicate longitudinally over an eight week music-based activity. Furthermore, it sought to draw out any relationships that may exist between the way people communicated and the actions and processes of the music, musicians and carers. The main components of the theory are discussed below.

The communicative actions observed included both verbal and non-verbal aspects of communication. Verbal communication can be compromised for people with dementia therefore reducing the opportunities for making connections with other people, building relationships, sharing experiences and belonging to a group. This is particularly the case if the environment they are in preferences verbal methods. According to Ridder (2003) it is essential that both verbal and non-verbal communication are attended and responded to for people with dementia allowing for social interactions and therefore relationships to develop. This study supports this view and indicated that with careful noticing and responding to both
verbal and non-verbal communicative actions a social interaction can occur through the use of mirroring and turn taking.

Caldwell (2008) supports that mirroring is “a way of capturing attention, a door to enter the inner world of our partners” (p. 72). Previous research has shown that several non-verbal communication techniques have been developed that use mirroring as their core foundation. Two examples of these techniques are intensive interaction (Nind & Hewitt, 2012) and the adapted version for people with dementia, adaptive interaction (Ellis & Astell, 2017). Both techniques have been shown to improve quality of life for people with communication impairment, increase their non-verbal communication repertoire and allow for a connection to be built between people (Ellis & Astell, 2017). The musicians’ use of mirroring and turn taking during the group may offer the same benefits and support Wigram’s (2012) research that music can help to develop a non-verbal conversation between two people.

The communicative actions and the subsequent social interactional components align with previous research indicating the importance of relationship centred care. In doing so, interactions can be developed in order to reduce social isolation (Nolan et al., 2004; Tresolini et al., 1994). The theory aligns closely with Kitwood’s (1997) theory of personhood. This model emphasises play (spontaneous expression), stimulation (multisensory interaction), creation (being active in creativity) and facilitation (supporting participation in activities) as key elements of person-centred care. Kitwood (1997) also highlighted the importance of social connections, throughout cognitive decline, as a means of supporting the person with dementia.

The multisensory nature of the intervention and the scaffolding it provides to communication supports previous research that has indicated that a multisensory environment
can improve communication between staff and residents (van Weert, van Dulmen, Spreeuwenberg, Ribbe & Bensing, 2005). Furthermore, several of the residents showed that they had remembered certain routine parts of the group indicating that a musical multisensory environment can enhance learning and remembering in advanced dementia.

This study also offers insight into the development of agency for people with dementia. According to Boyle (2014) people with dementia have been historically assumed to have little or no agency, due to agency theory being heavily influenced by verbal abilities. However, Boyle (2014) argues that agency can be demonstrated through the expression of emotion and non-verbal behaviour. This study supports this argument in that it could be seen that the residents were given several opportunities to make choices: a choice to participate from the onset, of how to participate, whether (and how) to influence the musician’s actions and about the music being created (Camic et al., 2018).

Implications

Dementia care. This study has implications for dementia care. Staff and relatives could be encouraged to notice and respond to non-verbal communication that may be very subtle or unremarkable in day-to-day life. By doing so, they may be able to develop social interactions and therefore strengthen relationships with people with dementia. Vasse, Vernooij-Dassen, Spijker, Rikkert, and Koopmans (2010) observed both staff and relatives have highlighted communication as an area that is very challenging with people with dementia. Live music that responds to individual communicative action within a multisensory environment can be a way of responding to and building social interactions for people who may find verbal expression difficult. Taken with other studies involving music and singing in the early to middle stages of dementia, using live music in residential care may be able to reduce isolation, increase enjoyment for staff and residents and encourage types of
communication that could increase positive interactions in residential care environments. This study also indicated that one-to-one interactions led to changes in communicative actions and social interactions. This is important for staff to be aware of. It may be challenging, however, within the restraints of health care or residential services to undertake this on a routine basis.

**Music for Life groups.** The majority of the interactions occurred between the musicians or carers and the residents with dementia. It may be that the residents could be encouraged to direct their instrument playing towards each other to increase the group’s interaction as a whole. It is interesting that the character of the music seemed important to the communicative actions observed and it would be worth musicians within future groups holding this in mind. Specifically, the tempo, nature and type of instrument used can impact on the way that people communicate. In this study, lively music of a faster tempo led to changes in communicative actions particularly when the djembe drum was used.

**Methodological.** According to Griffiths and Smith (2016), the analysis of microdata from detailed descriptors of verbal and non-verbal interactions using video recorded data allows for the theorising of behaviour that may usually be unremarkable, small or unseen. The use of video analysis in this study allowed careful observation of subtle communicative actions and the 360 degree camera allowed for observation of interactions; what other people were doing at that moment and what was happening in the music. These nuanced interactions and behaviours would likely have been missed if a camera with a more limited field of view (capturing only a subset of participants) had been used or only field observations had been made. The ability to slow the recording, pause, go back and look at specific moments allowed for a detailed analysis of behavioural and interactional aspects.
Limitations

The nature of the methodology and the detail of observation performed was essential for observing the nuanced behaviours and the subtle interactions surrounding them. Although time consuming, according to Griffiths and Smith (2016) this is not necessarily a limitation but instead a caution about the methodology. Theoretical sampling techniques were used throughout to collect data from video observations across eight live and one recorded music sessions for one group. The timing of the recorded music session (it was run prior to the live music sessions) may have influenced the differences in observations that were noted for that session. During that first session the participants could have been less familiar with the musicians and the format and this familiarity developed over time.

A larger scale study may be able to gather data from similar groups in different residential care settings involving people from different socioeconomic or ethnic backgrounds. Although grounded theory assumes that the theoretical understanding applies to the context it is derived from, the limited sample meant that it was not possible to feel certain that this intervention would result in a similar analysis in a different setting with other participants. There was also a possibility of the influence of the effect of the researcher’s and supervisors’ preconceptions and assumptions, although these were discussed and reflected on in supervision and a research diary.

Future research

Further research could include the carers and musicians’ experiences of being in the group and how the group might further support the senses framework suggested by Nolan et al. (2004). This framework suggests that all parties involved in caring need to experience relationships that promote a sense of security, belonging, continuity, purpose, achievement, and significance. It seems likely that the intervention described in this study could encourage
the development of relationships for the staff and therefore help to promote relationship-centred care outside of the group.

**Conclusion**

This study lent support to the notion that people with late stage dementia were active communicators in a variety of verbal and non-verbal ways within a multisensory live music-based communicative environment. When these communicative actions were noticed and responded to through the use of careful observation by the musicians, it led to a positive social interaction taking place through the use of mirroring, turn taking and humour. In this way people with dementia were given the opportunity to make a choice as to how to participate and to influence the creation of the music and the “musical conversation”; by doing so people with dementia experienced agency. The developing grounded theory of a multisensory communicative environment through music for people with late stage dementia supports Kitwood’s (1997) theory of personhood and relational theories of dementia care (e.g. Nolan et al’s, 2004, senses framework). Implications for dementia care and future research were discussed.
References


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UDK: 303. 02. 39.01:303


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Section C: Appendices of Supporting Material
Appendix A: SURE (2018) Checklist for RCTs and Experimental Studies

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes/Can't tell/No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Does the study address a clearly focused question/hypothesis?</td>
<td></td>
</tr>
<tr>
<td>Population/Problem?</td>
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<tr>
<td>Can you identify the setting &amp; eligibility criteria?</td>
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<tr>
<td>Intervention?</td>
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<tr>
<td>Comparator/control?</td>
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<tr>
<td>Outcomes?</td>
<td></td>
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<tr>
<td>Can you identify the primary outcome?</td>
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<tr>
<td>2. Was the population randomised?</td>
<td></td>
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<tr>
<td>If YES, were appropriate methods used?</td>
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<tr>
<td>Eg: random number tables, opaque envelopes</td>
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<tr>
<td>Note: The following methods are not appropriate:</td>
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<tr>
<td>alternating participants coin toss, birth dates, record numbers, days</td>
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<tr>
<td>of the week</td>
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</tr>
<tr>
<td>3. Was allocation to intervention or comparator groups concealed?</td>
<td></td>
</tr>
<tr>
<td>Is it possible for those allocating to know which group they are</td>
<td></td>
</tr>
<tr>
<td>allocating people to?</td>
<td></td>
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<tr>
<td>As above, methods such as alternating participants coin toss, birth</td>
<td></td>
</tr>
<tr>
<td>dates, record numbers, days of the week will not allow appropriate</td>
<td></td>
</tr>
<tr>
<td>allocation concealment.</td>
<td></td>
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<tr>
<td>4. Were participants/investigators blinded to group allocation?</td>
<td></td>
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<tr>
<td>If NO, was assessment of outcomes blinded?</td>
<td></td>
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<tr>
<td>5. Were interventions (and comparisons) well described and appropriate?</td>
<td></td>
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<tr>
<td>Aside from the intervention, were the groups treated equally?</td>
<td></td>
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<tr>
<td>Was exposure to intervention and comparison adequate?</td>
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<tr>
<td>Was contamination acceptably low?</td>
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<tr>
<td>6. Was ethical approval sought and received?</td>
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<tr>
<td>Do the authors report this?</td>
<td></td>
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<tr>
<td>7. Was a trial protocol published?</td>
<td></td>
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<tr>
<td>Question</td>
<td>Answer</td>
</tr>
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<td>-------------------------------------------------------------------------</td>
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<tr>
<td>Was a protocol published in a journal or clinical trial registry before participants were recruited? If a protocol is available, are the outcomes reported in the paper listed in the protocol?</td>
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<tr>
<td>8. Were the groups similar at the start of the trial? Are baseline characteristics provided and discussed (e.g., age, sex, social class, life style etc.)? Are there any significant differences that may influence study outcomes?</td>
<td></td>
</tr>
<tr>
<td>9. Was the sample size sufficient? Were there enough participants? Was there a power calculation? If YES, for which outcome? Were there sufficient participants?</td>
<td></td>
</tr>
<tr>
<td>10. Were participants properly accounted for? Was follow-up a 80%? Were patients analysed in the groups to which they were randomised? Was an intention to treat analysis conducted? Was the follow-up period long enough?</td>
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<tr>
<td>11. Data analysis Are the statistical methods well described? Consider: How missing data was handled; were potential sources of bias (confounding factors) controlled for; How loss to follow-up was addressed.</td>
<td></td>
</tr>
<tr>
<td>12. Results Were all important outcomes assessed? Were outcome measures reliable (e.g., objective or subjective measures)? Are effect sizes, confidence intervals/standard deviations provided? Were all outcome measurements complete? Are the authors’ conclusions adequately supported by the results?</td>
<td></td>
</tr>
<tr>
<td>13. Is any sponsorship/conflict of interest reported?</td>
<td></td>
</tr>
<tr>
<td>14. Finally...consider: Did the authors identify any limitations? Are the conclusions the same in the abstract and the full text?</td>
<td></td>
</tr>
</tbody>
</table>

Summary
Add comments relating to areas of concern that were unavoidable and a statement indicating if the results are reliable and/or useful.

This checklist should be cited as: Specialist Unit for Review Evidence (SURE) 2018. Questions to assist with the critical appraisal of randomised controlled trials and other experimental studies available at: [http://www.cardiff.ac.uk/specialist-unit-for-review-evidence/resources/critical-appraisal-checklists](http://www.cardiff.ac.uk/specialist-unit-for-review-evidence/resources/critical-appraisal-checklists)

### Appendix B: SURE (2018) Checklist for Qualitative Studies

*Specialist Unit for Review Evidence (SURE)*

**Questions to assist with the critical appraisal of qualitative studies**

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**Citation:**

<table>
<thead>
<tr>
<th>Study Design:</th>
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</thead>
</table>

1. **Does the study address a clearly focused question/hypothesis?**

   - Setting?
   - Perspective?
   - Intervention or Phenomena
   - Comparator/control (if any)?
   - Evaluation/Exploration?

<table>
<thead>
<tr>
<th>Yes</th>
<th>Can't tell</th>
<th>No</th>
</tr>
</thead>
</table>

2. **Is the choice of qualitative method appropriate?**

   - Is it an exploration of e.g. behaviour/reasoning/beliefs?
   - Do the authors discuss how they decided which method to use?

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<thead>
<tr>
<th>Yes</th>
<th>Can't tell</th>
<th>No</th>
</tr>
</thead>
</table>

3. **Is the sampling strategy clearly described and justified?**

   - Is it clear how participants were selected?
   - Do the authors explain why they selected these particular participants?
   - Is detailed information provided about participant characteristics and about those who chose not to participate?

<table>
<thead>
<tr>
<th>Yes</th>
<th>Can't tell</th>
<th>No</th>
</tr>
</thead>
</table>
4. Is the method of data collection well described?
   - Was the setting appropriate for data collection?
   - Is it clear what methods were used to collect data?
   - Type of method (e.g., focus groups, interviews, open questionnaire etc) and tools (e.g., notes, audio, audio visual recording).
   - Is there sufficient detail of the methods used (e.g., how any topics/questions were generated and whether they were piloted; if observation was used, whether the context described and were observations made in a variety of circumstances).
   - Were the methods modified during the study? If yes, is this explained?
   - Is there triangulation of data (i.e., more than one source of data collection)?
   - Do the authors report achieving data saturation?

5. Is the relationship between the researcher(s) and participants explored?
   - Did the researcher report critically examining/reflecting on their role and any relationship with participants particularly in relation to formulating research questions and collecting data.
   - Were any potential power relationships involved (i.e., relationships that could influence the way in which participants respond)?

6. Are ethical issues explicitly discussed?
   - Is there sufficient information on how the research was explained to participants?
   - Was ethical approval sought?
   - Are there any potential confidentiality issues in relation to data collection?

7. Is the data analysis/interpretation process described and justified?
   - Is it clear how the themes and concepts were identified in the data?
   - Was the analysis performed by more than one researcher?
   - Are negative/discrepant results taken into account?
### 8. Are the findings credible?
- Are there sufficient data to support the findings?
- Are sequences from the original data presented (e.g., quotations) and were these fairly selected?
- Are the data rich (i.e., are the participants’ voices foregrounded)?
- Are the explanations for the results plausible and coherent?
- Are the results of the study compared with those from other studies?

### 9. Is any sponsorship/conflict of interest reported?

### 10. Finally... consider:
- Did the authors identify any limitations?
- Are the conclusions the same in the abstract and the full text?

**Summary**
Add comments relating to areas of concern that were avoidable and a statement indicating if the results are reliable and/or useful.

---

This checklist should be cited as:
Specialist Unit for Review Evidence (SURE) 2018. Questions to assist with the critical appraisal of qualitative studies available at: [http://www.cardiff.ac.uk/specialist-unit-for-review-evidence/resources/critical-appraisal-checklists](http://www.cardiff.ac.uk/specialist-unit-for-review-evidence/resources/critical-appraisal-checklists)

Adapted and updated from the former Health Evidence Bulletins Wales (HEBW) checklist with reference to the NICE Public Health Methods Manual (2012) and previous versions of the Critical Appraisal Skills Programme (CASP) checklists.
Appendix C: Ethical Approval

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Appendix D: Participant Information Sheet and Consent Form

Consent Form for family members (page 1 of 2)
Version 1A (28/6/17)

Participant ID: __________________

Title of Project: Understanding communication in a Music for Life group

Name of Researchers: Amy Clare, Daniel Lai, Professor Paul Camic and Professor Seb Crutch.

Please initial each box if you agree

1. I confirm that I have read and understand the information sheet (version 1A dated 28/6/17) for the above research. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.

2. I understand that the Music for Life group session will be video recorded for the purpose of this research.

3. I also understand the video recordings may be used in possible future research and for educational purposes.

4. I also understand that my family member will be asked to wear the Empatica wristband for one or two music sessions. I agree to them wearing it.

5. I understand that anonymous data from this project will be available to Canterbury Christ Church University and University College London researchers; results from this research will be submitted as part of two
doctoral theses and for journal publications, and that information from the study may be used in future research projects.

6. I understand that anonymous data from this project will be available to Canterbury Christ Church University and University College London researchers; results from this research will be submitted as part of two doctoral theses and for journal publications, and that information from the study may be used in future research projects.

7. I give informed consent for the participant to take part in this present project and acknowledge that the participation is voluntary and that they are free to withdraw at any time without giving any reason.

Name of Participant: ________________________________

Name of Person giving consent: _______________________

Signature: _________________________________________

Date: _____________________________________________
Information about the Projects for Family Members Version 1A (28/6/17)

Hello. Our names are Amy Clare, Daniel Lai, Professor Paul Camic and Professor Seb Crutch. We are researchers at Canterbury Christ Church University and University College London; Amy and Daniel are completing their doctoral degrees in clinical psychology. Paul and Seb are the supervisors of the project; both are highly experienced researchers in dementia care and the arts. We would like to invite you to take part in a research project about the nature of verbal and non-verbal communication within a Music for Life group taking place at Jewish Care.

Before you decide, it is important that you understand why the research is being done and what it would involve for the person you are consenting for. You are welcome to tell others about the study if you wish.

Part 1 of this sheet tells you the purpose of this study and what will happen if the person take part.

Part 2 gives you more detailed information about how the study will be conducted.

Part 1

What is the purpose of the study?

The purpose of the research is to gain an understanding about the nature of communication within a Music for Life group. There are two parts to this research
GROUP MUSIC INTERVENTION AND DEMENTIA

project. Both will use the same video recordings of Music for Life sessions. The first project will explore the nature of how people might communicate or express their emotions without using words, the nature of the interactions between all the people present in the group and how music may impact on communication with or without words. The second project of the study will be using the video recorded footage to help develop a video analysing tool to assess people with dementia’s level of engagement in a Music for Life group. The development of the two will enable us to investigate the process that occurs within the Music for Life group, and potentially identify factors which enable people with dementia to engage.

Why am I being provided with this information?

You are being provided this information because a person close to you will be taking part in the Music for Life group at Jewish Care. However, the person taking part may find it very difficult or not be able to give their own consent to being involved with the study. Usually, when this happens an individual that is close to the person who cannot give consent is asked on their behalf. The group will be video recorded and sections of these recordings will be watched as part of the study.

Your family member will also be asked to wear an Empatica E4 wristband for up to 3 of the sessions. The wristband looks like a watch and it measures the physical responses of heart rate, bodily movement and skin conductance. It feels no different than wearing a watch and causes no discomfort. If your family member wants to remove the wristband at any time after it is fitted, we will remove it as soon as they have indicated this to us verbally or non-verbally.

Does the person have to take part?

No, nobody has to take part. It is entirely up to you to decide whether the person is involved in the research. If you agree for them to take part, we will then ask you to sign a consent form. If you do not want them to take part in the research, this would not affect their ability to take part in the Music for Life group or any other care at Jewish Care.

What are the possible disadvantages and risks of taking part?
There are no known disadvantages or risks for taking part in the Music for Life group. The video recording device is smaller than a tennis ball and is able to capture a 360 view of the group without any interference in the enjoyment and participation by group members.

What are the possible benefits of taking part?

The results of this study will be used to develop a better understanding of how people might express themselves with or without words. It will highlight the importance of noticing, valuing and responding to any forms of communication within a group setting, in order to improve wellbeing and relationships for people with more severe levels of impairment in dementia. It will also look at how music, singing and the musicians influence communication.

Will my taking part in this study be kept confidential?

Each person’s confidentiality will be safeguarded during and after the study. No participant in the Music for Life group will be identified. The video recordings will be kept on a password protected computer that only the researchers have access to. The video file will also be encrypted file, which assures its safety and confidentiality; we will not use any form of internet communication to transfer video files.

Who has approved the study?

This study has been approved by an independent research review panel at the Salomons Centre for Applied Psychology, Canterbury Christ Church University. It has also been reviewed and given approval by a Canterbury Christ Church University Research Ethics Committee on date……

Who is organising and funding the research?

Canterbury Christ Church University and the Created Out of Mind Hub at the Wellcome Collection are funding the research. Jewish Care and Wigmore Hall are helping organise the Music for Life groups and are partners in this research.
Part 2

What will happen if I don't want to the person to carry on with the study?

If you change your mind about the person participating in the research, but still want them to come to the groups, you can simply let Jewish Care know at the beginning of the group. You do not have to give a reason.

What if there is a problem?

If there is a problem you can ask one of the Jewish Care staff to help you or to give you more information.

Concerns and Complaints

If you have any concerns or questions about the research, please contact Professor Paul Camic, Salomons Centre for Applied Psychology, Canterbury Christ Church University, paul.camic@canterbury.ac.uk. You can also leave a message on Paul’s telephone at 03330 117 114. He will get back to you as soon as possible.

If you would like to make a complaint about any aspect of the research please contact: Professor Margie Callanan, Chair, university ethics panel at Salomons Centre for Applied Psychology, Canterbury Christ Church University at margie.callanan@canterbury.ac.uk or telephone 03330 117 094.

What will happen to the results of the research study?

We will send you a brief review of the study when it is completed and the data is analysed, letting you know what we have learnt from it. Please inform Professor Camic if you do not wish to receive this. The results of the study will also be part of the doctoral dissertations of Amy Clare and Daniel Lai. It is hoped that the results of the research will also be published in journal articles.

Further information and contact details
If you would like to speak to the research team about the study or have questions, please contact Professor Paul Camic at paul.camic@canterbury.ac.uk. If you provide a telephone number he can also call or email you.

Thank you.
Appendix E: Description of Intervention

The Music for Life group consisted of eight hour long sessions on a weekly basis with an additional initial session that consisted of recorded music. The eight live music sessions followed a similar format each week with three routine pieces of music and improvised music between them. The three routine pieces of music were as follows:

- A beginning piece of music that was played using the harp, flute and oboe (apart from session three that involved flutes and an oboe). Music of a slow tempo and gentle nature following the same tune each week. This was closely followed by:
  - The ‘Welcome Song’. A piece of music with singing. The same tune each week led by one of the musicians and going round the room singing ‘welcome’ to each resident and naming them individually. Singing accompanied by the harp (apart from session three which involved accompaniment by a drum).
  - An ending piece of music, the same tune as the beginning piece of music, that was played by the flute and harp of a slow tempo and gentle nature following the same tune each week with singing accompaniment (apart from session three which involved flutes and singing).

The improvised music was created using a mixture of instruments including flute, oboe, harp, and percussion and developed according to the response of the residents. The improvised music tended to focus on one resident at a time but could have a range of character within each session. Throughout each session the residents were given the opportunity to play instruments, they were given a choice or were provided with an instrument chosen by a carer or a musician. The instruments that they could choose were mainly percussive (e.g. shakers, drums or rainmakers) but also included instruments that produced different notes such as glockenspiels.
The recorded music session involved music from a music streaming service on the lead musician’s laptop. The music had a range of different tempos and a variety of characteristics for example slow, gentle, and lively.
Appendix F: Sample transcript

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Appendix G: Initial Codes

<table>
<thead>
<tr>
<th>Initial codes</th>
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<tbody>
<tr>
<td>1. verbal output in silence</td>
</tr>
<tr>
<td>2. verbal feedback in response to music finishing</td>
</tr>
<tr>
<td>3. talking to staff when no music</td>
</tr>
<tr>
<td>4. talking to staff member in silence of recorded music</td>
</tr>
<tr>
<td>5. talking to staff member during recorded music</td>
</tr>
<tr>
<td>6. talking to group</td>
</tr>
<tr>
<td>7. talking to musician whilst playing</td>
</tr>
<tr>
<td>8. talking to musician during recorded music</td>
</tr>
<tr>
<td>9. talking to another person during pauses</td>
</tr>
<tr>
<td>10. talking out loud to no specific person during recorded music</td>
</tr>
<tr>
<td>11. talking in response to own name</td>
</tr>
<tr>
<td>12. talking during 1 to 1</td>
</tr>
<tr>
<td>13. talking after playing with musician</td>
</tr>
<tr>
<td>14. staff member talking during recorded music</td>
</tr>
<tr>
<td>15. smiling when leading or 1 to 1</td>
</tr>
<tr>
<td>16. smiling to self during recorded music</td>
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<tr>
<td>17. smiling to self during music</td>
</tr>
<tr>
<td>18. smiling in response to welcome song</td>
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<tr>
<td>19. smiling in response to own name</td>
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<tr>
<td>20. smiling in response to musician</td>
</tr>
<tr>
<td>21. smiling in response to laughter</td>
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<td>22. smiling in response to hand over hand</td>
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<tr>
<td>23. smiling at others during recorded music</td>
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<td>24. smiling at others during music</td>
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<tr>
<td>25. smiling at other people after playing own instrument</td>
</tr>
<tr>
<td>26. smiling at musicians during gentle music</td>
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<td>27. smiling at musician during talking</td>
</tr>
<tr>
<td>28. smiling and talking in response to carer leaning in and talking during recorded music</td>
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<td>29. smiling after leading</td>
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<td>30. smile in response to singing or dancing</td>
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<tr>
<td>31. response to 1 to 1 comments from musician</td>
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<td>32. vocalising or singing along</td>
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<td>33. singing to self</td>
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<td>34. singing in response to own name</td>
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<tr>
<td>35. singing along to welcome song</td>
</tr>
<tr>
<td>36. singing after seeing staff singing</td>
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<td>37. pointing</td>
</tr>
<tr>
<td>38. playing instrument in response to vigorous music</td>
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<tr>
<td>39. playing instrument in response to staff encouragement or modelling</td>
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<td>40. playing instrument in response to music</td>
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<td>41. looking at others talking during silence</td>
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<tr>
<td>42. looking at others talking during recorded music</td>
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<td>43. looking at others talking during music</td>
</tr>
<tr>
<td>44. looking at person playing recorded music</td>
</tr>
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<td>45. looking at people during silence</td>
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<td>46. looking at people during music</td>
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<td>47. looking at an object</td>
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Appendix H: Theoretical Memos
Appendix I: Early Versions of the Theory
Physical observations:

- Singing
- Smiling
- Pointing
- Dance-like movement

- Laughter
- Talking

- Body positioning
- Body movement
- Looking
- Eyes—open or shut

- Playing instrument

Music sets up an environment of:

- Opportunity for making choices
- Noticing and responding
- Leading music
- Choice

It enables:

- Mirroring
- turntaking

Learning
March 2017 – I have been spending time reflecting on why I chose this client group and area to study for my MRP. I think I felt a certain sense of pressure at the start of this course about choosing a topic area and a supervisor with significant research experience. I have not felt very confident with my research skills having worked as a clinician for over ten years and last doing research over ten years ago whilst training in to my previous career. My experiences as a psychology assistant with older adults sparked my interest in working with this client group in particular around activities focusing on improving wellbeing and quality of life. I have always had an interest in communication (my previous job as a speech therapist helped confirm this) and I think that people who show challenging behaviour are often misunderstood. I am interested in how people express their emotions and communicate their inner world when they may not be able to say words. I think that care services need to emphasise this form of communication, in fact I feel very strongly about this. I am considering why I feel so strongly about working with people with dementia – I think a part of it is associated with my dad who has been showing signs of dementia for several years and the thought of him being isolated in his own world and simply medicated without anyone acknowledging even the smallest form of him attempting to share his inner world horrifying. Music has always been a passion of mine, the ability it has to connect and draw out emotions, spark memories and to connect with other people. It makes sense to me that music may be used to help build relationships, reduce isolation, express emotions and support communication.

When it was mentioned that grounded theory may be a good way to investigate communication within the music for life group I felt intimidated and when I started looking into it quite overwhelmed. I started to doubt my abilities and it still crosses my mind as to ‘what if I don’t find anything in my analysis?’. I am also quite anxious about the time I will take to analyse the data and how I will go about doing that. Writing several drafts of my proposal has really helped me to see the logical steps I will take. Looking through the literature has also confirmed to me how interested I am in the topic and I feel excited to be doing the MRP I’m doing. I hope that it will offer some insight into how people express their inner worlds and the importance of music to connect with isolated people.

17/5/17 – today I printed out my MRP proposal that has been approved and so I am considering that this is the start of something quite massive for me. I will be so proud of myself to get the MRP completed as I have often doubted my academic ability and in particular my research skills.

13/6/17 – I have received really positive feedback from senior staff regarding the proposal and the project itself so I feel very excited and proud about this. For something that seemed so massive I am starting to believe that I can do it. I am starting to complete the ethics form now which is making me consider the ethical concerns with people who do not have capacity to consent to research and how important it is to safeguard them. I am also starting to feel very anxious about the MRP review and whether I will be able to explain the rationale for grounded theory and the methodology involved. This is not an area that I have ever been confident within.
13/10/17 – My project has received ethics approval – this has led me to feel excited about the project and that it may be doable. I can see that it is within my skills with the support of my supervisor. I am now starting to think about part A and what it should be on. I am aware that it needs to highlight a gap but I am thinking at the moment that I either want to look at the impact of music on people with dementia or the shift from person-centred to more relationship centred care in dementia. I could look at theories of non-verbal communication for people with dementia (this is a definite gap!).

30/10/17 – I have been thinking more about my part A and considering that I want to get started on it rather than leave it to the last minute. I am considering looking at broad areas of relationship centred care (vs person centred) for people with dementia, impact of music groups or communication for people with dementia. I’m a bit unsure as to which to go for and whether they are too broad. I know it has to feed in to my part B so I need to read my proposal and look for the gaps. I am also starting to feel anxious about using grounded theory and the amount of time I am going to spend watching the video. I have got the fly360 director on my computer now and have spent time becoming familiar with the programme whilst using a short trial video my supervisor sent me via drop box. I have been reading about video analysis and grounded theory and it has hardly been used before, I can see that it will be helpful to pick up on non-verbal communication. Griffiths work in particular has been very interesting – working with people with ID who do not communicate verbally.

7/12/17 – I feel more reassured about part A now having met with my supervisor. Today I spent time reading through some part As and reading about systematic reviews. Although it still feels overwhelming and daunting I am not feeling time pressured at this point but feel I can slowly start mapping out a structure and starting to search hopefully in the New Year. I have a focus group arranged for 11/12/17 – I feel nervous that the practical aspects are not going to work – for example the recording or skype. I am also feeling slightly panicked at the thought of having to transcribe the groups, start video analysis and start my part A all at the same time. It is overwhelming.

15/12/17 – I completed my first skype focus group on Monday with two of the musicians. It was very helpful in that it really started my thinking process about communication within the music group and the impact on the musicians themselves of being engaged within the interactive process of the group. I felt energised following our conversation for two reasons – I had been very anxious about whether the group would run smoothly (would my audio recorder work, would the questions be helpful) and it seemed to go well. I was also reminded of how passionate I feel about trying to improve the quality of life for older people with dementia and how I really believe in the power of music as a process and for sharing a world with somebody who may not be in touch with the here and now with other people for most of their day. I have been reading about music and the benefits of it in relation to symptoms of dementia but also as a communication tool.

18/2/18 – I have now received all my video data and have checked that I can watch it in 360 on the programme on my laptop, I can slow it down and zoom in. I feel excited that I can now get going with the data analysis. I have also completed the second focus group. The third and fourth focus groups (held with the paid carers) has been very stressful to arrange. I had been emailing a contact about it since November and had heard nothing back. I was given a new contact a week or so ago and they kindly spoke to the person who needed to arrange the
carers shifts etc. and they offered the dates of next week. I have had to cancel clients and get permission from my placement supervisor. I also had to arrange childcare at the last minute. I am now going to London for two 45 minute groups next week so it will be great to get those completed.

I have just started to watch the video footage. I decided to start with the control group and focus on one person at first whilst following them through the sessions as this will help me to notice any changes and keep one person in mind rather than several. This is so that I do not have to spend time moving the camera between different people. I have found it very moving watching the footage – especially the live music (rather than recorded music) – at times I feel a sense of loss and deep sadness – I wonder if this is a reflection of how I imagine it might feel for the person with dementia and their families to experience the changes that come about with dementia. I have also felt very uplifted that some people with dementia and the paid carers and the musicians have this opportunity for a shared experience – there is something very joyful and heart-warming about a group of people coming together in such a thoughtful and emotive environment and sharing this together regardless of a diagnosis, age or background – it transcends all these differences! It has also played into more existential fears on my own and my families behalf – what will my experience of ageing be like, what will it be like for my children, how will I make connections to people without words or without sharing a reference point or reality. What will it be like for my parents to be elderly and how will I be able to connect with them? This can make me feel scared and sad.

19/05/18 – I have been spending an hour or two a week watching the videos now and it has been a pleasure. The more I watch the more I see the importance of making a connection using music with older people who may be isolated by dementia or anything else. It is an emotive process – watching people engage, even in the smallest way and do something different in response to the music has been joyful. It has also make me concern the ageing process for myself and what support I might hope for when I become older. It has also made me think of the individual residents and their experiences and to care somewhat about what they are doing right now. I feel as though I have got to know them in a way, albeit in a one sided way, and I wonder what it will feel like to let them go at the end, it will be a loss for me and makes me think of endings and deaths and grief and how I cope with these things in my life. I would never have thought that this process would be so thought provoking and fulfilling for me. The depth of my learning has astonished me – on an academic level but also about myself and the power of music and connection on a feelings level rather than on an intellectual level.

18/8/18 – I have been spending the past three months painstakingly watching the videos and typing a narrative of my observations. I have then been coding the narrative and starting to think about ideas that are coming from the data. I have been revisiting the data and comparing each example and code. I have found it rather exhausting but also satisfying to be immersed in the data and looking at it in such fine detail. I am concerned that I am spending such a long time on it. I am also concerned that I will struggle to think of a theory. My next job is to look through the coding and re look at some of the data and to start to jot down some ideas and concepts. I have been thinking about my past experiences of mirroring and intensive interaction and wondering how this comes in to play during the group sessions, I have also been struck by the opportunity for each participant to make a choice or change the
environment through their non-verbal communication. I am wondering about whether all the behaviours I can see can be separated or whether they belong to one category.

1/10/18 – I have been spending the past few months going over the data – coding more examples and am now starting to think of the relationships between some of the categories in order to get more of a conceptual understanding of what is happening. I have not been looking at part A because I don’t want to influence my thoughts about the data. We have also now started our older adults lectures and I am really enjoying it, I think it is an area I would like to work in.

6/10/18 – I have felt as though I am stuck with the data, I am finding it very hard to move from a description of the scene to more conceptual coding and I think I have been missing looking at the internal and external context of the image and the relational or process information. If I could turn my focus to that I think it would help with the more conceptual categories and theoretical codes. I am also aware that we only have seven months and I have been looking at this data for quite a while, I had hoped to be starting to write it up now and it is hard not to compare where I am with where other people are. I have spent today reading through two articles on visual grounded theory and I hope that will help me take a step forward with it. I am also going to meet with my supervisor to talk it through.

This week on placement I was explaining to a colleague, who is a speech therapist, about my research. It struck me that I am concentrating so much on communication, which may be because of my speech therapy background and it being within my comfort zone of knowledge, I wonder if I have neglected the more psychological aspects of my observations but I suppose that may enter in to more conceptual analysis as I move from one of observation to one of hypothesising about the process.

7/11/2018 – Have identified some core categories I have been thinking about the relationships and conceptual aspects of the data. I have written a potential narrative of the theory and drawn several attempts at a diagram for how the theory might look. With support from my supervisor I am now needing to structure the theory and explain each component carefully, step by step.

1/12/2018 – I have been thinking about the more conceptual ideas that are arising from the data – the social aspects and the group aspects. I have often found myself moving away from the data and being too entrenched in concepts particularly about the group aspects e.g. belonging and identity. I am sure this comes in to play however these concepts are not entrenched in the data. I have to keep checking myself on this and not get drawn in to it. It has to be grounded in the data. I have done several versions of the final theory and have been helped by reading through two articles provided by my supervisor as to how to carry out grounded theory and build a conceptual understanding. Communication and the validation of non-verbal communication in particular seems essential to a conceptual understanding.
Appendix K: Chiovitti and Piran’s (2003) Guidelines

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<th>Standards of rigour</th>
<th>Suggested methods of research practice</th>
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<td>Credibility</td>
<td>1. Let participants guide the inquiry process</td>
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<td>2. Check the theoretical construction generated against participants’ meanings of the phenomenon</td>
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<td>3. Use participants’ actual words in the theory</td>
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<td>4. Articulate the researcher’s personal views and insights about the phenomenon explored by means of</td>
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<td>(a) Postcomment interview sheets used as a tool</td>
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<td>(b) A personal journal</td>
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<td>(c) Monitoring how the literature was used</td>
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<td>Auditability</td>
<td>5. Specify the criteria built into the researcher’s thinking</td>
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<td>Fittingness</td>
<td>6. Specify how and why participants in the study were selected</td>
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<td>7. Delineate the scope of the research in terms of the sample, setting, and the level of the theory generated</td>
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<td>8. Describe how the literature relates to each category which emerged in the theory</td>
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- Each manuscript should have 3 to 5 keywords.

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Main part of manuscript:
Abstract: Not to exceed 100 words.
Introduction: A description of the programme, it's history, how it is funded, location, and population served
Programme rationale and goals
How the programme is evaluated. This is a key area and authors should describe the evaluative aspects of the programme in detail. Please include any data the programme has collected if possible. Include a discussion of any challenges relating to evaluation, e.g. methodological issues, ethical issues, resource issues
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Direction of scoring should be stated for every measure used. Reliability estimates derived from the study sample should be reported for each measure, where appropriate.

It should be clear how many participants were approached/recruited (if these figures are known), how many participated, and the participant sample size for each analysis. The amount of missing data should be stated. Procedures used to handle missing data in the analyses should be described.

Sufficient rationale and detail of the analytic methods used to test the hypotheses should be presented.

It is important to articulate the criteria used to determine the study sample size.

**Results:**
It is helpful if authors organize the reporting of their findings such that it is clear which hypothesis is being addressed and, if possible, the order of this section follows that in which the hypotheses were initially presented at the end of the Introduction section.

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Appropriate estimates of effect size, confidence intervals and exact p-values should be reported for all results.

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Authors should avoid repeating the findings in detail. No new data should be introduced in the Discussion section.

Specific mention should be made in the consideration of study limitations of the potential for bias and error, such as that arising from the study methods (e.g. potential for allocation or testing bias, or measurement error), analyses (e.g. statistical conclusion error), and generalizability (e.g. sampling bias).
Guidelines for authors submitting qualitative research

Introduction:
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The methods should reflect the theoretical framework identified in the introduction, and research procedures and processes should be presented in sufficient detail. Processes of recruitment, ethics and consent, data collection and analysis should be covered, paying attention to the role of the researcher/team and any contributing contextual factors. The scope and limitations of the methods used should be acknowledged as well as the reasons why they were chosen.

Results:
The reader should be able to fully understand who participated in the research, how many (people), and to what extent (e.g. if participatory methods were used). If interviews were undertaken, it is useful to know the minimum / maximum / average interview length. Findings should be presented clearly, with data (e.g. quotations, field notes, creative outputs) distinguishable from their interpretation.

Discussion:
Authors should avoid repeating the findings in detail. No new data should be introduced in the Discussion section. This section should consider the study findings in light of the theoretical framework and existing literature identified in the introduction. Any unanticipated issues, including ethical or methodological challenges, should be considered here, along with the limitations of the study.

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- Information about supplemental online material

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Preparation of a Research Article

This page provides information about writing a Research Article for Wellcome Open Research, including the key sections that must be present in the article and details of figure and table formats. Please also refer to Wellcome Open Research’s editorial policies.

Criteria

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All new findings supported by original source data are welcome, regardless of the perceived interest and the extent of novelty (including null/negative and confirmatory results). The peer review focuses on whether the methods used are appropriate and the claims in the paper are sound, not on the likely impact of the work.

Submission to Wellcome Open Research is limited to Wellcome-funded researchers.

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For authors whose first language is not English, it may be beneficial to have the manuscript read by a native English speaker with scientific expertise. There are many commercial editing services that can provide this service at a cost to the authors.

Main Sections

1. Authors
2. Title
3. Abstract
4. Keywords
5. Main Body
6. Data (and Software) Availability
7. Reporting Guidelines (if applicable)
8. Consent (if applicable)
9. Author Contributions (if more than one author)
10. Competing Interests
11. Grant Information
12. Acknowledgments (optional)
13. Supplementary Material
14. References
15. **Figures and Tables (if applicable)**

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Please list all authors who played a significant role in developing the points presented in the article.

Please:

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- indicate who is/are the corresponding author(s).

Criteria for authorship are based on the Uniform Requirements for Manuscripts Submitted to Biomedical Journals. Being an author implies full responsibility for the article’s content and that the work conforms to our editorial policies. For large, multi-centre collaborations, the individuals who accept direct responsibility for the manuscript must be listed as authors.

Details of each author’s contribution must be listed in the Author contributions section.

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Please provide a concise and specific title that clearly reflects the content of the article.

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For most Research Articles, the following standard format will be the most appropriate:

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When antibodies are used, the species in which the antibody was raised, the manufacturing company or source laboratory, the catalogue or reference number, and whether it is a polyclonal or monoclonal antibody should be included. In addition, if the antibody has been previously validated, a reference to the validation study should be included. If the antibody has not been validated, full details of the dilution and use of the antibody should be given in the Methods section.

We encourage authors to add Research Resource Identifiers (RRIDs) to their article in order to unambiguously identify the following types of resources: antibodies, genetically modified organisms, software tools, data, databases and services. More information on this project is available from the Resource Identification Initiative and RRIDs can be obtained from the portal.

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Checklists are available for a number of reporting guidelines, including:

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- Systematic reviews and meta-analyses (PRISMA) and protocols (PRISMA-P)
- Observational studies (STROBE)
- Case reports (CARE)
- Qualitative research (COREQ)
- Pre-clinical animal studies (ARRIVE)

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We are using the CRediT Taxonomy to capture author contributions as we believe that having more detail of who did what brings transparency, enables recognition for researchers, and provides greater accountability for all involved. For more information click here.

You do not need to include an Author Contributions section in your manuscript: on submission, you will be asked for the contributions made by each author, to be selected from the list below. Anyone who has contributed but does not meet the criteria for authorship should be listed in the Acknowledgments section.

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<th>Role Definition</th>
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<td>Ideas; formulation or evolution of overarching research goals and aims.</td>
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<td>Management activities to annotate (produce metadata), scrub data and maintain research data (including software code, where it is necessary for interpreting the data itself) for initial use and later reuse.</td>
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All figures and tables should be cited and discussed in the article text. **Figure legends and tables should be added at the end of the manuscript.** Tables should be formatted using the ‘insert table’ function in Word, or provided as an Excel file. For larger tables or spreadsheets of data, please see our data guidelines for further information. Files for figures are usually best uploaded as separate files through the submission system (see below for information on formats).
Any photographs must be accompanied by written consent to publish from the individuals involved. Any distinguishing features, including medical record numbers or codes in the case of clinical images that could be used to identify the patient or participant concerned must be removed from the images.

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**Figure formats:** For all figures, the color mode should be RGB or grayscale.

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If you submit a graph, please export the graph as an EPS file using the program you used to create the graph (e.g. SPSS). If this is not possible, please send us the original file in which the graph was created (e.g. if you created the graph in Excel, send us the Excel file with the embedded graph).

If you submit other forms of line art such as flow charts, diagrams or text to be displayed as an image, please export the image as an EPS file (e.g. if creating phylogenetic trees with specialized programs), or send us the original file that was used to create the image (e.g. EPS or AI files if Adobe Illustrator was used, or a DOC, DOCX, PPT, PPTX or equivalent file if Word or PowerPoint was used).

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Appendix N: End of Study Report for Ethics Panel

Salomons Centre for Applied Psychology Ethics Panel
Canterbury Christ Church University
Salomons Centre,
1 Meadow Road,
Tunbridge Wells,
Kent
TN1 2YG

Dear Professor Margie Callanan

Study Title: A multisensory communicative environment through music for people with late stage dementia

Please find the enclosed end of study report for the project mentioned above. This study was reviewed by the Salomons Centre for Applied Psychology ethics panel in July 2017. After receiving ethical approval, once conditions as suggested by the committee had been satisfactorily adhered to, the study formally commenced in September 2017. Data collection progressed smoothly with no ethical issues or concerns raised. The study concluded in March 2019.

Please do not hesitate to contact me should you have any concerns or queries.

Yours sincerely,

Amy Clare
Trainee Clinical Psychologist
Canterbury Christ Church University
A multisensory communicative environment through music for people with late stage dementia

Aims

This project investigated a live music intervention for people living with dementia through interactive music sessions. It allowed a conceptual understanding to be built around communication that enabled us to theorize how people with dementia may express themselves non-verbally in response to music, and in relation to the other members of the group over time.

Methodology

This study employed a qualitative, longitudinal design influenced by classic grounded theory (CGT) (Glaser & Strauss, 1967; Glaser, 1998) and video analysis as established by Griffiths (2013). The participants with advanced dementia included eight adults who lived in the same residential care home, staff members from the care home and professional musicians trained in the intervention. Data was generated from eight hour-long weekly sessions (the intervention) and one hour-long recorded music listening session.

Findings

For this study, music making was seen as a facilitator and as a way to communicate in later stage dementias. The essential overarching aspect of the music making groups appeared
ANCHORED IN MULTIPLE COMMUNICATIVE ACTIONS THAT OCCURRED BETWEEN MUSICIANS AND RESIDENTS, MUSICIANS AND STAFF, AND RESIDENTS AND STAFF. THESE WERE NOT LINEAR FORMS OF COMMUNICATING WITH A CLEAR BEGINNING AND END BUT WERE OFTEN A NETWORK OF COMPLEX AND SUBTLE INTERACTIONS DISCOVERED THROUGH CLOSE OBSERVATION. THE PROCESS THAT OPERATED TO FORM THE CORE CATEGORY OF THESE MULTIPLE TYPES OF COMMUNICATION WAS A MULTI-SENSORY MECHANISM CREATED BY THE MUSIC MAKING GROUPS THAT PROVIDED A UNIQUE AND SUPPORTIVE COMMUNICATIVE ENVIRONMENT.

CONCLUSIONS

THIS STUDY LENT SUPPORT TO THE NOTION THAT PEOPLE WITH LATE STAGE DEMENTIA WERE ACTIVE COMMUNICATORS IN A VARIETY OF VERBAL AND NON-VERBAL WAYS WITHIN A MULTISENSORY LIVE MUSIC-BASED COMMUNICATIVE ENVIRONMENT. WHEN THESE COMMUNICATIVE ACTIONS WERE NOTICED AND RESPONDED TO THROUGH THE USE OF CAREFUL OBSERVATION BY THE MUSICIANS, IT LED TO A POSITIVE SOCIAL INTERACTION TAKING PLACE THROUGH THE USE OF MIRRORING, TURN TAKING AND HUMOUR. IN THIS WAY PEOPLE WITH DEMENTIA WERE GIVEN THE OPPORTUNITY TO MAKE A CHOICE AS TO HOW TO PARTICIPATE AND TO INFLUENCE THE CREATION OF THE MUSIC AND THE “MUSICAL CONVERSATION”; BY DOING SO PEOPLE WITH DEMENTIA EXPERIENCED AGENCY. THE DEVELOPING GROUNDED THEORY OF A MULTISENSORY COMMUNICATIVE ENVIRONMENT THROUGH MUSIC FOR PEOPLE WITH LATE STAGE DEMENTIA SUPPORTS KITWOOD’S (1997) THEORY OF PERSONHOOD AND RELATIONAL THEORIES OF DEMENTIA CARE (E.G. NOLAN ET AL.’S, 2004, SENSES FRAMEWORK). IMPLICATIONS FOR DEMENTIA CARE AND FUTURE RESEARCH WERE DISCUSSED.
Appendix O: End of Study Report for Participants

Dear residents, carers and musicians,

Thank you for taking part in my study, it would not have been possible without you. I enclose a summary of the study and the findings, please do not hesitate to contact me should you have any concerns or queries,

Yours sincerely,

Amy Clare
Trainee Clinical Psychologist
Canterbury Christ Church University
A multisensory communicative environment through music for people with late stage dementia

Aims

This project investigated a live music intervention for people living with dementia through interactive music sessions. It allowed a theory to be built around how people with dementia may express themselves without words in response to music, and in relation to the other members of the group over time.

Methodology

The study involved watching videos of some of the eight Music for Life sessions and the one recorded music session. Video analysis was used to examine the videos.

Findings

For this study, music making was seen as a facilitator and as a way to communicate in later stage dementias. There were many different communicative actions that occurred between musicians and residents, musicians and staff, and residents and staff. These often involved a network of complex and subtle interactions discovered through close observation. The multiple types of communication were supported by a multi-sensory mechanism created by the music making groups that provided a unique and supportive communicative environment.
Conclusions

This study supports the view that people with late stage dementia were active communicators in a variety of verbal and non-verbal ways within a multisensory live music-based communicative environment. When these communicative actions were noticed and responded to through the use of careful observation by the musicians, it led to a positive social interaction taking place through the use of mirroring, turn taking and humour. In this way people with dementia were given the opportunity to make a choice as to how to participate and to influence the creation of the music and the “musical conversation”.