Agitated behaviours in Alzheimer’s Disease and related disorders:
Music and music therapy research

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Abstract
The purpose of this paper is to review literature that addresses music and music therapy interventions for people with Alzheimer’s Disease and related disorders who display agitated behaviours. Several music therapy journals and databases were investigated. Two types of studies emerged. The first type included music and music therapy studies on (a) general agitation, (b) wandering, (c) verbal agitation, or (d) sleep disturbance. The second type focused on activities of daily living interventions, specifically mealtimes or bathing agitation. The findings of these studies will be described and interrelated research outcomes discussed. Many articles support the premise for familiar or individualised music reducing agitation. Similarities in responses to agitated behaviours will be discussed and suggestions for more rigorous research designs are also presented.

In the past decade an explosion of literature has identified music and music therapy interventions as an effective alternative or adjunct to pharmacological strategies for people with Alzheimer’s Disease and related disorders (ADRDs) who display agitated behaviours (Brotons, 2000; Brotons, Koger & Pickett-Cooper, 1997; Vink, 2000). Early descriptive research indicated that behaviours, particularly wandering and aggression, manifested less or were more manageable as a consequence of music therapy interventions (Bright, 1986, 1988; Lloyd, 1992; Norberg, Melin & Asplund, 1986). It has only been in the past ten years that studies have attempted to examine systematically the efficacy of music in managing agitated behaviours.

Both active music therapy methods (singing and listening to songs, music and movement and instrument playing) and recorded music have been employed and found successful in reducing the occurrence and frequency of agitated behaviours (Brotons, 2000; Brotons et al., 1997; Vink, 2000). While music therapists have conducted studies using both active methods and recorded music, other health professionals have used recorded music only. The aim in music studies has been to investigate music as an environmental modifier and this characterises the difference between music and music therapy studies (Tabloski & Williams, 1998). It is only recently that attempts have been made to discern differences between methods: this reflecting a broader endeavour within gerontological music therapy research. After conducting a meta-analytic study on gerontological music therapy literature, Koger, Chapin & Brotons (1999) concluded that they were “unable to determine the relative efficacy of different methodological protocols within the existing literature” (p. 9).

The purpose of this paper is review research examining the use of music and music therapy used for people who have ADRDs and display agitated behaviours. The aim is to summarise and organise interrelated research outcomes as a precursor to considering a theoretical framework for how music therapy can decrease agitation. A theory regarding the role of music in decreasing agitation has already been suggested. Gardner (1997) postulated a mid-range theory of the role of individualised music in reducing agitation. Individualised music is defined as music that has special meaning and is integrated into an individual’s life. Influenced by the progressively lowered stress threshold (PLST) model that suggests agitation is caused by over-stimulation of environmental
stimuli (Hall, 1994; Hall & Buckwalter, 1987), the mid-range theory suggests that when agitation occurs, the individualised music functions to stimulate remote memory. These happy memories then override the external stimuli and produce more positive and soothing feelings (Gerdner, 1997, 1998; Gerdner, Mentes & Titler, 1999; Gerdner, 2000).

Scope of Articles Reviewed

The scope of this review included all clinical empirical studies on the use of music and music therapy with people with ADRDs, who display agitated behaviours, that were published in refereed journals and written in English. They were located via either: (a) reviewing articles published since 1980 in the Journal of Music Therapy, Music Therapy Perspectives, The Australian Journal of Music Therapy, and British Journal of Music Therapy; and (b) conducting on-line data base searches on psyclit from 1986, CAIRSS from 1980, CINAHL from 1980, and Dissertations Abstracts International, from 1996.

Nineteen clinical empirical studies were identified, including experimental, quasi-experimental and case study reports. Four of these studies were theses. They were then categorised into two groups of behaviours (dependent variables). The first type included music and music therapy studies on (a) general agitation, (b) wandering, (c) verbal agitation, or (d) sleep disturbance. The second type focused on activities of daily living interventions, specifically mealtime or bathing agitation.

All of these studies either measured changes in the occurrence or frequency of agitation before and after music interventions, or measured changes during sessions using time-sampling. Often an already established behaviour rating scale was employed, including the Cohen-Mansfield Agitation Inventory (CMAI) (Cohen-Mansfield, Marx & Rosenthal, 1989), the Disruptive Behaviour Rating Scale (DBRS) (Mungas, Weiler, Franzi & Henry, 1989) and the Agitated Behaviour Scale (ABS) (Corrigan, 1989). During time-sampling the frequencies of behaviours were counted in time intervals.

Table 1 outlines the music and music therapy literature addressing behaviour management for those who have ADRDs. Each study is described in terms of the authors’ professions, design features and the level of significance in the reduction of agitation. The authors’ own terms have been retained when presenting the findings.

Music and Music Therapy Agitation Studies

General Agitation

Structured music therapy sessions were successful in decreasing agitation levels (Brotons & Pickett-Cooper, 1996; Clair & Bernstein, 1990), while background music had no influence (Clair & Bernstein, 1994). Brotons & Pickett-Cooper (1996) found that small music therapy groups reduced agitation significantly from pre- to post-test. Varying patterns for different types of behaviours emerged. While wandering and crying reduced, handwringing and repeated expressions of distress increased. An inability to sit still, psychomotor activity and rapid speech did not alter considerably from pre- to post-test.

Recorded music, used in structured time frames, also reduced general agitation levels in those who have ADRDs (Gerdner & Swanson, 1993; Tabloski et al., 1995). Individualised recorded music had differing effects on the agitation of five individuals in the study by Gerdner & Swanson (1993). For three participants, there was a delaying effect in reducing agitation levels: their agitation peaked on the commencement of the music, but then levels decreased significantly. Tabloski et al. (1995) played “calming” classical music and found that agitation
Table 1  
Music and music therapy research for those with ADRDs who display agitated behaviours

<table>
<thead>
<tr>
<th>Authors &amp; Year</th>
<th>Profession</th>
<th>n</th>
<th>Independent Variable (music condition)</th>
<th>DV measure &amp; design</th>
<th>Results: Reduction of agitation</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Agitation</td>
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<tr>
<td>Brotons &amp; Pickett-Cooper (1996)</td>
<td>RMT</td>
<td>20</td>
<td>Structured MT activities (i.e., singing &amp; rhythm)</td>
<td>DBRS measure; RM design P-P-test</td>
<td>Total behaviours (p = .001)</td>
</tr>
<tr>
<td>Clair &amp; Bernstein (1994)</td>
<td>RMT</td>
<td>28</td>
<td>Recorded “stimulative” &amp; “sedative” music</td>
<td>Author-designed measure; time-sampling (1 min.) real-time: exp. design</td>
<td>No significance between all conditions (p &lt; .375)</td>
</tr>
<tr>
<td>Ebberts (1994)</td>
<td>RMT</td>
<td>24</td>
<td>3 conditions: singing, drumming &amp; movement</td>
<td>Mod. CMAI measure; time-sampling (30 sec.); exp. design</td>
<td>Siring: (p &lt; .05), drumming (p &lt; .001), movement (p &lt; .001)</td>
</tr>
<tr>
<td>Gerder (1998)</td>
<td>RN</td>
<td>39</td>
<td>Recorded individualised &amp; classical music</td>
<td>Mod. CMAI measure; RM, P-P-test design</td>
<td>Individualised music (p &lt; .001)</td>
</tr>
<tr>
<td>Gerder &amp; Swanson (1993)</td>
<td>RN</td>
<td>5</td>
<td>Recorded individualised music</td>
<td>Mod. CMAI measure; time-sampling (10 min.) real-time: RM design</td>
<td>Baseline-intervention reduction (m = 46.64% behaviours)</td>
</tr>
<tr>
<td>Nugeat (2000)</td>
<td>RMT</td>
<td>6</td>
<td>Preferred live and taped songs</td>
<td>Mod. CMAI measure P-P-test: Within-subject cross-over exp. design</td>
<td>Total behaviours (p &lt; .05) PNABs (p &lt; .05)</td>
</tr>
<tr>
<td>Tabloski, McKinnnon-Howe &amp; Remington (1995)</td>
<td>RN</td>
<td>20</td>
<td>Recorded “calming” music</td>
<td>ABS measure; P-P-test: RM design</td>
<td>Total behaviours (p &lt; .001)</td>
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<tr>
<td>Wandering</td>
<td></td>
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<tr>
<td>Clair &amp; Bernstein (1990)</td>
<td>RMT</td>
<td>3</td>
<td>Structured MT activities (i.e., singing &amp; rhythm)</td>
<td>Time-sampling (secs.) video analysis, RM design</td>
<td>Sitting &amp; active participation (p &lt; .05)</td>
</tr>
<tr>
<td>Fitzgerald-Cloutier (1993)</td>
<td>RMT</td>
<td>1</td>
<td>2 conditions: reading with singing—a capella &amp; with drum</td>
<td>Time-sampling (secs.) real-time: quasi-exp. AB design</td>
<td>Sitting time: music (m = 11.11 mins.) reading (m = 5.35 mins.)</td>
</tr>
<tr>
<td>Study</td>
<td>Group</td>
<td>N</td>
<td>Type of Intervention</td>
<td>Methodology</td>
<td>Results</td>
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<tr>
<td>Groene (1993)</td>
<td>RMT</td>
<td>30</td>
<td>Structured MT activities (i.e., singing and rhythm)</td>
<td>Time-sampling (secs.) video analysis: 2 group exp. RM design</td>
<td>Sitting time longer in music ($p &lt; .05$); accumulation effect ($p &lt; .05$)</td>
</tr>
<tr>
<td>Scruggs (1991)</td>
<td>RMT</td>
<td>12</td>
<td>Structured MT activities (i.e., singing) &amp; contingent music listening</td>
<td>Time-sampling (secs.) real-time: ABACAB reversal design</td>
<td>Both conditions ($p &lt; .05$)</td>
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<tr>
<td><strong>Verbal Agitation</strong></td>
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<tr>
<td>Burgio, Scilley, Hardin, Hsu &amp; Yancey (1996)</td>
<td>Psych</td>
<td>9</td>
<td>New Age music</td>
<td>CMAI measure; time-sampling randomised: exp. RM design</td>
<td>Occurrence &amp; frequency of ($p &lt; .05$)</td>
</tr>
<tr>
<td>Cathy &amp; Holm (1994)</td>
<td>OT</td>
<td>3</td>
<td>Recorded preferred &amp; classical music</td>
<td>Time-sampling (10 secs.) real-time: single-subject withdrawal design</td>
<td>Occurrence &amp; frequency of vocalisations ($p &lt; .05$)</td>
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<tr>
<td><strong>Sleep disturbances</strong></td>
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<tr>
<td>Lindenmuth, Patel &amp; Chang (1992)</td>
<td>ND</td>
<td>2x</td>
<td>New age music</td>
<td>Author-designed measure, time-sampling real-time: RM design</td>
<td>Increase in sleep time ($p &lt; .05$)</td>
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<tr>
<td><strong>Mealtime Agitation</strong></td>
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<tr>
<td>Denney (1997)</td>
<td>RN</td>
<td>9</td>
<td>Recorded “relaxing” music</td>
<td>Mod. CMAI measure: time series reversal (ABAB) design</td>
<td>Occurrence &amp; frequency reduced ($m = 8%$)</td>
</tr>
<tr>
<td>Goddaer &amp; Abraham (1994)</td>
<td>RN</td>
<td>29</td>
<td>New Age music</td>
<td>Mod. CMAI measure: time series reversal (ABAB) design</td>
<td>Total behaviours ($p &lt; .0001$); PNABs ($p &lt; .01$)</td>
</tr>
<tr>
<td>Ragneskovog, Kihlgren, Karlson &amp; Norberg et al. (1996)</td>
<td>RN</td>
<td>5</td>
<td>Recorded “soft”, Swedish 20-30s pop, 80s rock</td>
<td>Author-designed measure; time-sampling (2 min.): RM design</td>
<td>Occurrence &amp; frequency of total behaviours; increase in mealtime duration ($m = 22%$)</td>
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<tr>
<td><strong>Bathing Agitation</strong></td>
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<tr>
<td>Clarke, Lipe &amp; Bilbrey (1998)</td>
<td>RMT</td>
<td>18</td>
<td>Recorded preferred music</td>
<td>Author-designed measure, time-sampling (secs.): RM design</td>
<td>“Hitting out” behaviours ($p &lt; .05$)</td>
</tr>
<tr>
<td>Thomas, Heitman &amp; Alexander (1997)</td>
<td>RT</td>
<td>14</td>
<td>Recorded preferred music</td>
<td>Mod. CMAI measure, Time-sampling (secs.): RM design</td>
<td>PNABs ($p &lt; .05$)</td>
</tr>
</tbody>
</table>

P-P-test = Pre- post-test; RM design = Repeated Measures design; exp. = experimental design; PNABs = physically nonaggressive behaviours; PABs = physically aggressive behaviours; m = mean
levels reduced significantly in 20 participants from pre- to post-test using the ABS scale.

General agitation also reduced significantly in five out of six participants in a study comparing live and taped songs (Nugent, 2000). In particular, it was found that there was a significant reduction in physically nonaggressive behaviours (PNABS), such as wandering and general restlessness. While there was no significant difference between the live and taped conditions, it was observed that the participants were more focused and less restless during the live songs.

Clair & Bernstein (1994) found that background recorded music had no effect on the agitation levels. Twenty-eight participants were exposed to three conditions: no music, "stimulative" or "sedative" recorded music, randomly selected and played at three set times during the course of a day. There was no significant difference across the days or times of the days. It was, however, found that the stimulative selection (Glenn Miller) at times reduced agitation levels more than the sedative selection (Janalea Hoffman). This led the authors to propose that music preference may have been the variable. The dynamic level of the music and environmental variables, such as the influence of other participants' agitation levels, were thought to also influence individual agitation levels.

Findings from a study by Gerdner (1998) supported the premise that individualised music reduces agitation more than other types of selections. She compared the effects of two conditions, recorded individualised and classical music selections, on 39 individuals who displayed agitation. A significant reduction in agitation scores was found with the participants having the individualised music, and the 30-minutes following the music, when compared to the classical music at baseline.

Ebberts (1994) is the only researcher to have attempted a systematic comparison between three music therapy methods: drumming, movement and singing activities. Active participation was found to be far greater during both drumming and movement, and lowest in the singing interventions. Specifically, significant differences were found between both movement and drumming with singing, while no differences occurred between movement and drumming. Visual and imitation cues were proposed to have a role in reducing agitation more during these activities.

Wandering

Several studies have established that wandering can be successfully reduced with music interventions (Clair & Bernstein, 1990; Fitzgerald-Cloutier, 1993; Groene, 1993; Nugent, 2000; Scruggs, 1991). The responses of three individuals with agitation involved in structured music therapy sessions were traced by Clair & Bernstein (1990) for 15 months. Variables including room, time, seating and positive reinforcement (such as touch) were controlled. All three participants remained seated significantly longer or for the duration of sessions, even though each individual continued to deteriorate in functioning levels within the months of the program.

Fitzgerald-Cloutier (1993) and Groene (1993) both found that music interventions reduced wandering more than reading interventions, and had an accumulative effect over time. When comparing the pre-to post-test measures of physical and temporal seating proximity, Groene found that participants sat significantly longer in music compared to reading. There was an accumulation effect from the first to last sessions in both groups. In a single-case study Fitzgerald-Cloutier found that a female participant remained seated longer in the music, while during the reading seating was more sporadic. Variables such as eye contact during the music and rate of cognitive decline were thought to have influenced the study. While it has been established that music is more beneficial, these two studies should be reviewed with caution. These studies compared verbal interventions with music, a medium that does not require verbal processing for participation (Brotons et al., 1997).
The effects of structured music activities and contingent music listening with verbal prompting were compared by Scruggs (1991). The wandering of 12 participants decreased and participation time increased in both music conditions, compared to baseline conditions.

**Verbal Agitation**

Two studies found that recorded music significantly reduced verbal agitation (Burgio et al., 1996; Casby & Holm, 1994). Casby & Holm compared the frequency of verbal agitation in three participants who were subjected to three conditions: no music, classical music and preferred music. The music was played through headphones for two participants, while the other received the music free-field. There was a significant reduction in verbal agitation observed in two participants using the preferred music, while there was no significance in reducing agitation in the participant when only classical music was used.

Burgio et al. (1996) found that there was a significant reduction in the incidence and frequency of verbal agitation of participants using New Age tapes compared to when not used. Staff were trained to play the tapes “as much as possible” in the afternoon and observations for data collection took place randomly. Staff compliance was found to be problematic, with tapes used only half of the time. Several factors were not taken into consideration in this study, including mean time of tape use, whether time frames were structured, and the effects of fatigue on the participants.

**Sleep disturbances**

One study examined the effects of music on sleep disturbances with those with ADRDs. Lindemann & Plante (1995) found a significant increase in the number of hours of sleep when New Age recorded music was used as an adjunct or alternative to medication for sleep disturbances for those with ADRDs. Two matched groups of 10 participants, those with ADRDs and “healthy” older adults who resided in the same nursing home, were compared. The music was turned on when it was observed individuals were restless. There was no significance in music increasing sleep patterns for the “healthy” group.

**Music with Acute Episodes of Agitation**

**Mealtime agitation**

Several studies have examined the successful use of music interventions to decrease the occurrence and frequency of behaviours during mealtime (Denney, 1997; Goddaer & Abraham, 1994) or increase meal-time duration (Ragneskog et al., 1996). All of the music and mealtime studies included a quasi-experimental repeated measures design to compare the effects of the recorded music interventions to baseline.

Goddæer & Abraham (1994) replicated a study by Courtright, Johnson, Baumgartner, Jordan & Webster (1990), who found that recorded music reduced aggressive behaviours of psychiatric patients at mealtime. They found that when comparing no music and New Age music for four weeks there was a significant decrease in the incidence of the variability of behaviours and, in particular, a significant reduction in physically nonaggressive and verbally agitated behaviours.

A Swedish study by Ragneskog et al. (1996) found that when examining the effects of three types of music - “soft relaxing” music, Swedish 1920-30s popular songs and popular 1980s rock music - on agitated behaviours during mealtimes, each type of music increased the duration of the mealtime. Mealtime duration increased the most during the soothing music interventions, followed by the 20-30s songs, then the 1980s rock music. It was observed during the relaxing music that the participants were more sedate in manner and ate at a slower pace.

Quiet classical music reduced agitation during mealtimes in a study by Denney (1997). Behaviours decreased during the music interventions and continued to remain 8% below the
baseline when withdrawn. It was felt that the music had a positive effect on the dining room atmosphere. There was less restlessness, more positive interactions between individuals and behaviours induced by the proximity of other agitated individuals were reduced.

While studies by Denney (1997), Goddaer & Abraham (1994) and Ragneskog et al. (1996) showed a significant reduction in agitation from baseline to intervention using music, they all used weekly repeated measures designs which did not take into consideration day-to-day variances in individual agitation levels (Cohen-Mansfield, 1999). Using this design it is difficult to control for variables that may alter behaviours other than the music.

**Bathing Agitation**

Two recent studies examined recorded preferred music on behaviours, particularly the reduction of physically aggressive behaviours (PABs), during bathing episodes (Clarke et al., 1998; Thomas et al., 1997). Thomas et al. found that there was a significant reduction in physical aggression when using recorded music with 14 participants, who were all assessed as having a pre-morbid interest in music. In particular, there was a significant difference between the second music observation and the first two post-music observations. As PNABs and verbal agitation remained, it was proposed that the music may have delayed the onset of aggression.

Clarke et al. (1998) also found that recorded music reduced PABs during bathing. Eighteen individuals were randomly assigned to receive either 10 control or 10 music sessions first. The “hitting out” behaviour reduced significantly during the music interventions and there were less behaviours manifested in total, a similar finding to Goddaer & Abraham’s (1994) study. The duration of the bathing did not have a significant effect on results.

**Discussion of Interrelated Research Outcomes**

From the 19 articles reviewed in this study, several common findings have been recognised. The literature reviewed has supported the premise that music and music therapy interventions reduce the occurrence and frequency of agitated behaviours for those with ADRDs (Brotons, 2000; Brotons et al., 1997; Vink, 2000). Several common findings have been identified that give support for how music and music therapy interventions reduce agitation. These include supporting the premise for familiar or individualised music reducing agitation more than other music selections (Casby & Holm, 1994; Gerdner, 1998), and similarities with some behaviours, including PABs, PNABs and psychomotor agitation (Brotons & Pickett-Cooper, 1996; Clarke et al., 1998; Goddaer & Abraham, 1994; Nugent, 2000).

An interesting observation of the literature reviewed is that there has been a lack of confluence between music therapy and interdisciplinary studies. The interdisciplinary studies, particularly those conducted by nurses using recorded music, did not often include references to music therapy research (Casby & Holm, 1994). It appears as if authors of these studies have a narrow view of music interventions, in that they viewed music therapy as an interventional therapy only (Tabloski & Williams, 1998).

Although very different in aetiology and prognosis, several references about individuals with ADRDs who display agitation have yielded similar findings to a study by Baker (2001, 1999), on the use of music with individuals experiencing posttraumatic amnesia (PTA) following head injury. Baker compared live and taped songs on orientation and agitation in 22 individuals and found a significant reduction in agitation, although there were no significant differences found between the live or taped songs. Parallels have been found with PNABs, such as a reduction in wandering and general restlessness and psychomotor agitation (Brotons & Pickett-Cooper, 1996; Clarke et al., 1998; Goddaer & Abraham, 1994; Nugent, 2000). Clearly, more research should be conducted
comparing the nature of agitation in ADRDs and PTA (Baker, 1999).

There are some consistent findings throughout the music and music therapy literature in relation to agitation. Several studies have suggested that music interventions tend to reduce the variability of agitated behaviours from pre- to post-test (Clarke et al., 1998; Goddaer & Abraham, 1994; Nugent, 2000). In the studies examining music and acute agitation a common finding was that music interventions may prevent extreme forms of agitation, such as physical aggression, or may replace lesser extremes of agitation such as PNABs or verbal agitation (Goddaer & Abraham, 1994; Thomas et al., 1994).

Several studies found that PNABs, such as wandering and general restlessness are significantly reduced with music interventions (Baker, 1999; Brotons & Pickett-Cooper, 1996; Clair & Bernstein, 1990; Fitzgerald-Cloutier, 1994; Goddaer & Abraham, 1994; Groene, 1993; Nugent, 2000; Scruggs, 1991). This is not surprising considering that the PNABs were found to occur the most frequently and the longest throughout the trajectory of dementia (Cohen-Mansfield et al., 1990).

There has been support that psychomotor agitation, such as “performing repetitious mannerisms”, an “inability to sit still” and “rapid speech”, do not alter considerably from pre- to post-test. Baker (2001), Brotons & Pickett-Cooper (1996) and Nugent (2000) all found consistent results, in that these behaviours became more purposeful and that participants had more control over these movements. Baker (1999) suggested that live songs, in particular, may allow those who display agitation to release energy in a more appropriate manner. These findings are also consistent with an observation by Cohen-Mansfield, Marx & Werner (1992) when conducting a study of the social environment on individuals who display agitated behaviours. They suggested that psychomotor agitation may be more under internal control, and thus not influenced by their social environment.

As has been highlighted, various music therapy methods, including both familiar and unfamiliar music, have successfully reduced agitation. Few studies have attempted to compare agitation levels with differing music therapy methods with earlier studies reporting more successful methods through trial and error (Clair & Bernstein, 1990; Fitzgerald-Cloutier, 1993). The findings of Ebbert (1994) and trends in other studies have suggested that the most successful active methods have mirrored the results of the general music therapy and ADRD studies. Structured movement and rhythm interventions have been more successful than singing in reducing agitation (Clair & Bernstein, 1990; Ebbert, 1994). No studies have addressed the effect of the structure of music therapy sessions with agitation levels. Brotons & Pickett-Cooper (1996) proposed that more research should be conducted in this area, in order to discriminate between purposeful interactions and not merely induce fatigue for those who have agitation.

Recorded music has included familiar, classical and New Age music selections and has often been influenced by the PLST model (Hall & Buckwalter, 1987) and dictated by common notions of “relaxing” music (Denney, 1997; Tabloski et al., 1995). While it was found that individualised music reduced agitation more than classical selections (Gerdner, 1998), no studies have attempted to delineate between “New Age” music with other recorded selections.

Studies continue to support the notion that familiar or individualised music significantly reduces agitation (Casby & Holm, 1994; Clair & Bernstein, 1994; Gerdner, 1998; Gerdner & Swanson, 1993; Nugent, 2000). It was suggested that future research should focus on defining the types of music most effective in reducing agitated behaviours (Denney, 1997). Clair & Bernstein (1994), however, warned against the prescriptive nature of music types, particularly the assumption that active music increases stimulation, while sedative decreases stimulation and consequently agitation: “Assumptions concerning the effect of certain types of music on individuals may be erroneous, and even deleterious” (p. 70).
Clair & Bernstein (1994) proposed that the reason familiar music is beneficial in reducing agitation is that it may provide structure, predictability and security, while unfamiliar music may create "a deleterious environment in which the individual cannot find comfort and security" (p. 67). While it could be stated that familiar songs may function to increase remote memory, none of the studies reviewed give evidence for the PLST mid-range theory proposed by Gerdner (1998). There is no evidence to support the notion that familiar songs produce pleasant thoughts and associations and that this is why there is a reduction in agitation. Applicability to this model may be limited to studies that use recorded music rather than active music therapy methods, although live songs have not been found to increase agitation and therefore do not appear to overstimulate when compared to taped songs (Baker, 1999; Nugent, 2000).

Active music therapy interventions may function to distract an individual from present behaviours or immediate antecedents. This was found by Fitzgerald-Cloutier (1993) who suggested that music therapy decreased wandering through not only increasing active participation and interaction with the therapist, but also that the music may have had a redirecting role: Distraction through interaction thus decreased the wandering behaviour. Although there were no significant differences in agitation between live and taped songs, Nugent (2000) observed that during the live songs the individuals were more focused, less restless and likely to fiddle with objects. It was theorised by Baker (1999) that familiar music for patients experiencing PTA "may have abated their anxiety, enhanced their awareness and understanding of their environment, and thereby decreased their agitation" (p. 93). Orientation levels may therefore be intrinsically linked to agitation levels.

Research into general agitation has suggested that cognitive impairment and the trajectory of ADRDs influence the sub-type and manifestation of agitated behaviours (Cohen-Mansfield, 1986; Cohen-Mansfield, Marx et al., 1989; Cohen-Mansfield & Taylor, 1998; Cohen-Mansfield, Werner, Watson & Pasis, 1995). The trajectory of ADRDs and cognitive levels may also influence differences in outcomes from music and music therapy agitation studies. This was observed by Denney (1997), who found differing results from Goddaer & Abraham (1994) when she replicated their study's design. She proposed that the participants in her study were more cognitively impaired than the participants in the Goddaer & Abraham study.

Problems with interpreting results

Several problems have been highlighted when attempting to interpret results of the music and music therapy literature. Comparisons in outcomes have been difficult due to differences in definitions and measuring tools, as well as extreme intersubject and intrasubject variability within the data among the studies. Several studies have attempted to overcome excessive intersubject variability by using within-subject designs (Clarke et al., 1998; Nugent, 2000; Thomas et al., 1997), although intrasubject variability has reduced external validity (Casby & Holm, 1994, Clarke et al., 1998; Nugent, 2000; Thomas et al., 1997).

Low scoring of behaviours in studies has also made the results difficult to interpret because it is hard to generate consistent results and have statistical significance. These factors may explain the variability and the lack of confluence between some studies (Denney, 1997; Goddaer & Abraham, 1994). The problem of limited sample size to establish significance has been considered a problem by several studies in establishing results (Casby & Holm, 1994; Clair & Bernstein, 1994; Clarke et al., 1998; Denney, 1997; Nugent, 2000; Thomas et al., 1997).

Using an already established behaviour rating scale, such as the CMAI, may sometimes be problematic, despite reliability and validity. Some behaviours may be given too much weighting or be lost by the scale. For example, in the study by Nugent (2000), one of the participants displayed a behaviour characterised by rapid breathing and, as this was not part of the CMAI, it had to be classified under "general restlessness". The measurement of the behaviours is reliant on the
Behaviours may also be interpreted in more than one way. For example, the handwringing described by Brotons & Pickett-Cooper (1996) could be interpreted as excitability of an individual rather than agitation. A behaviour rating scale when modified may also lose sensitivity in capturing the behaviour sufficiently, particularly when reduced to observable behaviours present (Denney, 1997) or to sub-types of agitation (Clarke et al., 1998). Burgio et al. (1996) suggested that a direct observational techniques with continuous observation was more sensitive to capturing behaviours, particularly those low scoring, although it has been highlighted that this method was expensive and time consuming (Cohen-Mansfield, 1999).

The findings of this survey suggest that there are some commonalities with how agitated behaviours respond to music and that behaviours that are psychomotor may not be reduced by music therapy interventions (Baker, 2001; Brotons & Pickett-Cooper, 1996; Nugent, 2000). Changes to agitated responses as a result of music therapy may not just be a feature among people experiencing ADRDs. Changes may also be observed in those with agitated behaviours resulting from other disorders, such as PTA (Baker, 1999). There is some evidence to suggest that the reduction of agitation may be inherently linked to increases in orientation levels, particularly when individualised music is used (Baker, 1999; Nugent, 2000).

The relationship between music therapy and agitation is no doubt complex. For example, decreasing agitation with music is largely determined by the behaviours presented, and behaviours are in turn influenced by the cognitive impairments of the individual (Cohen-Mansfield, Marx & Rosenthal, 1990; Cohen-Mansfield, Culpepper & Werner, 1995). Clearly more research is needed to determine the role of orientation with agitation and levels of cognitive impairment. More rigorous designs that include refined measuring tools and studies that have larger sample sizes are required to gather more data to assist in the research and treatment of people with ADRDs who display agitated behaviours.

References


**Glossary**

ADRDs: Alzheimer's disease and related disorders

ABS: Agitated Behaviour Scale

CMAI: Cohen-Mansfield Agitation Inventory

DBRS: Disruptive Behaviour Rating Scale

PABs: Physically aggressive behaviours

PLST model: Progressively lowered stress threshold model

PNABs: Physically nonaggressive behaviours

PTA: Posttraumatic amnesia