



## The Effects of a Montessori-Based Activity on Affect and Engagement in Persons with Dementia

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### Abstract

Developing stimulating and engaging group-based activities for persons with dementia can be challenging. A small body of literature has shown that activities based on Montessori principles may be superior to activities typically offered to persons with dementia in terms of increasing engagement and positive affect. The purpose of the current study was to add to this existing literature by comparing the effects of a Montessori-based group activity to typically-offered group activities in a sample of eight individuals with dementia living in a memory-care unit of a long-term care facility. The study used an A-B-A-B experimental design where baseline (A) involved observing activities typically offered in the facility and the intervention (B) involved participants playing a Montessori-based activity called "Memory Bingo". During both phases, participant's affect and engagement were recorded through direct observation. The Montessori-based activity appeared to yield greater levels of active engagement compared to typically-offered activities whereas positive affect remained relatively stable throughout all phases. Montessori-based activities, such as the one implemented in this study, may offer a promising alternative approach to activity programming that may result in increased enjoyment and participation in activities for persons with dementia.

### Keywords

Montessori; Activities; Older adults; Dementia; Long-term care

### Introduction

Developing stimulating and engaging activities for persons with dementia can be challenging because of the cognitive deficits (e.g., working memory, executive functioning, and language impairments) associated with dementia [1]. Although group-based activities may be preferred by facility staff because many residents can be served at one time while utilizing relatively few staff, developing group-based activities can be difficult because persons with dementia are a diverse population that can vary greatly in terms of severity of cognitive impairment, personality style, as well as personal interests and histories. Therefore, developing activities with broad appeal is a high priority for activity staff in long-term care facilities that serve individuals with dementia.

Typical activities offered in long-term care facilities for persons with dementia are often group-based and include things like reading,

crafts, and discussion/reminiscence groups [2]. These typically-offered activities are not always appealing to a wide range of individuals and it is not uncommon for residents to be disengaged during these activities [3]. Therefore, there is clearly a need for new activity programs that are: 1) interesting and engaging for persons with dementia, 2) appealing to a wide range of individuals in terms of age, gender, and severity of cognitive impairment, and 3) conducted in a group format so as to reach a large number of individuals while requiring relatively few staff.

Montessori-based activities for persons with dementia differ from typically-offered activities in that they are designed with specific principles in mind such as building on the participant's existing skills, breaking tasks down into smaller tasks, progression from simple tasks to more complex ones, repetition, use of external cues to guide participant behavior, and making tasks that are self-correcting [4,5]. In addition, Montessori-based activities take an individual's past interest, hobbies, and occupation into account and are designed to be modular in the sense that activities can be made easier or more difficult based on the capabilities of participants. Activities designed in this way are meant to increase engagement in activities, provide sensory stimulation and opportunities to reminisce, stimulate long-term memories, as well as compensate for the cognitive (and physical) deficits commonly associated with dementia [6]. Several studies have found that Montessori-based activities are superior to typically-offered activities in terms of the amount of positive affect displayed by residents and the extent to which residents with dementia are engaged in activities [1,2,7,8].

The purpose of the current study was to add to the existing literature on the effectiveness of Montessori-based activities with individuals with dementia. The current study compared the effects of a Montessori-based group activity to typically-offered group activities in a sample of eight individuals with dementia living in a memory-care unit. It was hypothesized that the Montessori-based activity would produce: 1) greater levels of positive affect, 2) less negative affect, and 3) more active engagement compared to group-based activities that are typically offered in a long-term care facility.

### Method

#### Participants

Eight individuals, five women and three men, meeting the following criteria were recruited for this study: an existing diagnosis of dementia, regular participation in activity programming, and adequate hearing, vision, and physical ability to participate in activities. Ages of participants ranged from 78 years to 96 years ( $M=90.13$ ,  $SD=5.97$ ). All participants lived in the secured memory care unit of a long-term care facility located in the Midwestern United States. Participants were recruited by asking staff at the participating long-term care facility to identify residents that had a diagnosis of a dementing illness (e.g., Alzheimer's disease) that was judged to be of at least moderate severity and that met the inclusion criteria mentioned above. Guardians of the participants were asked to provide informed consent for the individual.

#### Procedure

Dependent variables included participant affect (positive or negative) and engagement in the activity (active, passive, or non-

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engagement), which was measured through direct observation. Active engagement was defined as any verbal or motor behavior exhibited in response to the activity the participant was engaging in (e.g. talking in a discussion group, manipulating materials for a craft project, singing along to music, answering questions, manipulating cards in bingo). Passive engagement was defined as listening or looking behavior exhibited in response to the activity in which the client was participating (e.g. listening to a discussion, listening to music, watching others make crafts, listening to caller, watching others play bingo or interact). Non engagement was operationally defined as eyes gazing away from the activity for 10 seconds or longer or sleeping (e.g., repetitive play or apparently purposeless movements that are not part of the activity, talking to oneself, fidgeting with one's clothing or hair). Positive affect was defined as a participant showing overt signs of pleasure (e.g. smiling or laughing). Negative affect was defined as participant showing overt signs of anger, sadness, or anxiety. Operational definitions of all five dependent variables were based on previous studies using a similar methodology [2].

This study utilized an A-B-A-B experimental design to test the effects of the intervention. During baseline (A), typical activities were observed. Typical activities included ball darts, news review, and sing-alongs. All activities (in all phases of the study) were conducted by the memory care unit's activity coordinator. Data were collected through direct observation using a 10-second partial-interval recording system. To elaborate, once an activity started, a randomly-selected participant was observed for a 10-second interval. Researchers then recorded the participant's affect and type of engagement during the next 10-second interval. Then, researchers rotated to the next participant (in a clockwise fashion) and observed in the same manner. This observation procedure continued until the activity was complete; therefore, all participants were observed multiple times during each activity.

During the intervention phase (B), participants played a Montessori-based group activity called "Memory Bingo" that has been investigated in other studies [2,7,9]. Memory Bingo can be defined as a simplified version of bingo that compensates for some of the cognitive deficits associated with dementia, so can be played independently by persons with dementia. Participants were provided with four cards containing a word and picture linked to corresponding cards that were called out. Cards included names and pictures of people, places, or products (e.g., the Lone Ranger, hula hoops, Elvis Presley, etc...) that were likely to be popular and well-known in the 1940s and 1950s when participants were teenagers and young adults. These stimuli were chosen for the game because dementia tends to affect short-term memory and new learning, whereas memory for remote factual information is more likely to be preserved into the moderate stages of the disease, so it was expected that these types of stimuli were more likely to be engaging and familiar to participants [10]. Also, the back of calling cards included a series of prompts that activity staff used to stimulate discussion/remembrance among group members during the game (e.g., "Did you like Elvis Presley's music?"). When a calling card was called and visually displayed by the activity leader, participants were asked to flip over the matching playing card if they had one. Assistance flipping cards was provided to individuals as needed if they had motor deficits. The game continued until someone flipped over all of their cards. The first participant who flipped over all four cards won that game. Data collection procedures in the intervention phase were identical to those conducted during baseline.

Data collection sessions lasted approximately 30 minutes and were conducted two to three days per week during each phase of the

study. A minimum of three data points were collected per phase, with data collection continuing until stability in the data was achieved. At the end of each activity, the percentage of intervals in which each type of affect (positive and negative) and engagement (active, passive, or non-engagement) were displayed across the entire sample of participants was calculated. Aggregated data was calculated because the purpose of the study was to determine the impact of the activity on the group as a whole as opposed to the response of each individual participant. It should also be noted that although eight individuals were eligible to participate in this study, not all eight participated in each activity (participants were sometimes sleeping, ill, or had visitors while activities were being held). Furthermore, individuals living in the facility that were not participants in this study were frequently involved in each activity, although data was not collected with these individuals. This was allowed for practical reasons-the facility could not exclude individuals from participating nor could they force individuals to participate in activities, so the composition of the group was allowed to naturally vary based on who was willing and/or able to participate, as is typically done in long-term care facilities. Data were collected, however, only if a minimum of three study participants were present for an activity. On average, each activity included four of the study's participants along with four additional individuals who were not participating in the study.

Inter-observer agreement (IOA) data was collected for all five dependent variables during 28% of data collection sessions. IOA was calculated by first calculating the total number of intervals in which there was agreement about the occurrence or nonoccurrence of a particular behavior (e.g., positive affect). The number of agreements was then divided by the sum of all agreements and disagreements and then multiplied by 100. This IOA formula was calculated for all five dependent variables. The mean IOA across all five dependent variables was 95.1% (range = 50% to 100%).

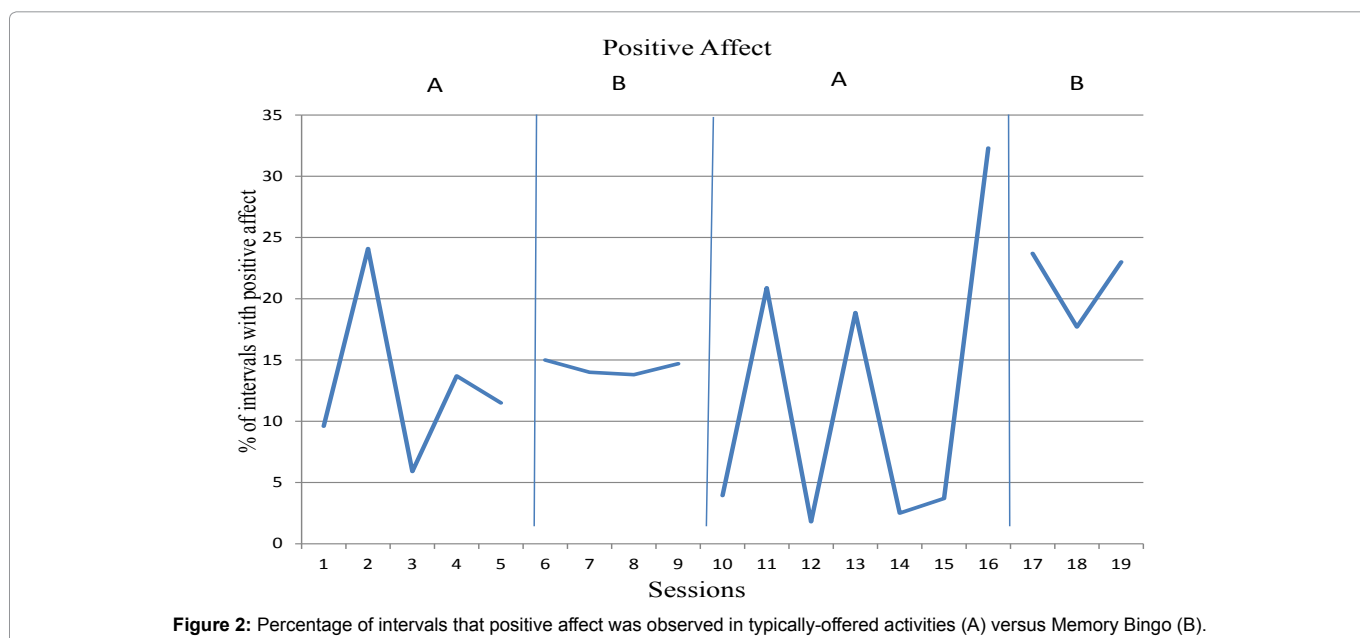
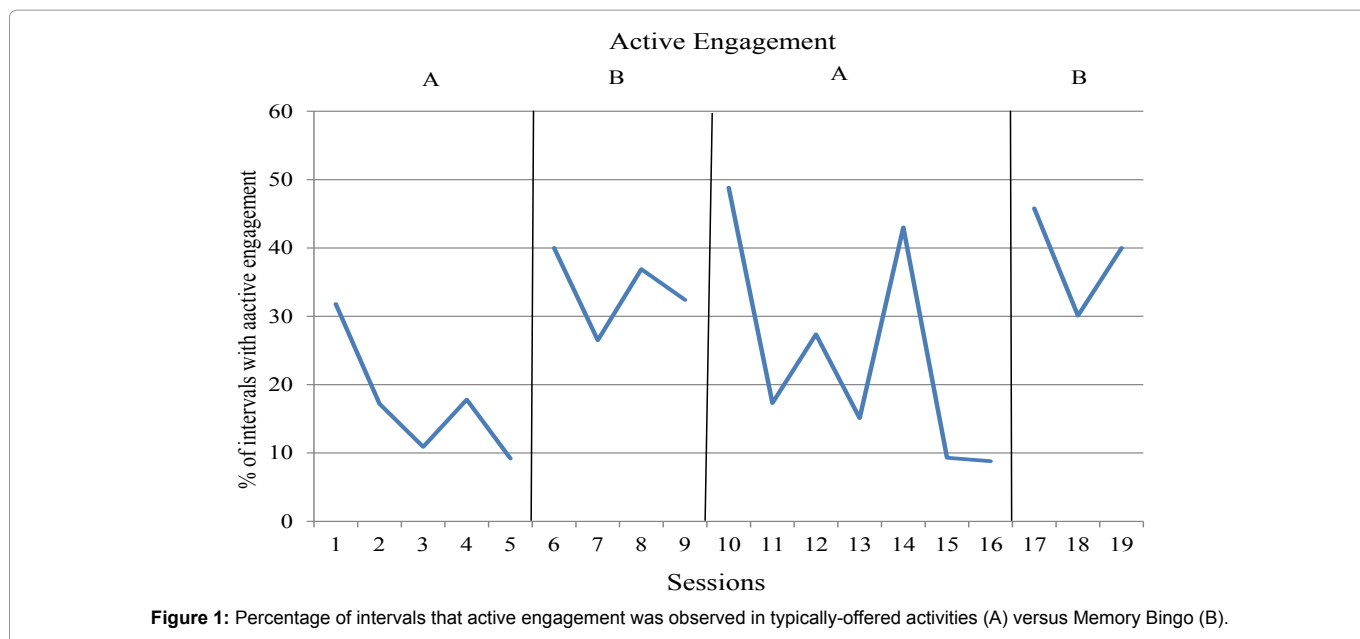
## Results

The primary dependent variables for this study were active engagement, positive affect, and negative affect. Data for negative affect are not presented because it occurred very infrequently during all phases of the study. Table 1 shows the mean percentage of intervals in which active engagement and positive affect were displayed across all data collection sessions in that phase. Concerning active engagement, results indicated that greater amounts of active engagement were observed amongst study participants during Memory Bingo compared to typically-offered activities. Figure 1 shows active engagement data for each data collection session across all four phases of the study. Visual inspection of the data in Figure 1 indicates that greater amounts of active engagement occurred during Memory Bingo. It should be noted that three data points in the A phases of the study (data points 1, 10, and 14) overlap with data in the Memory Bingo phases. These three data points all involved the sing-along activity and indicate that sing-along was more engaging than other typically-offered activities and just as engaging as Memory Bingo. Memory Bingo, however, was superior to other typically-offered activities in terms of increasing active engagement. Regarding positive affect, data indicate that displays of positive affect amongst study participants remained relatively stable across all phases (Table 1 and Figure 2).

As a means for gathering information about the social validity of the intervention [11], qualitative data was collected from the facility's activity coordinator who led all activities during the study.

**Table 1:** Mean % of intervals in which behaviors occurred.

Phase	Active Engagement	Positive Affect
Typical Activities phase 1	17.4	13.0
Memory Bingo phase 1	34.0	14.4
Typical Activities phase 2	24.2	12.0
Memory Bingo phase 2	38.6	21.5



Questions were asked regarding any perceived differences in resident behavior between Memory Bingo and typically-offered activities, general opinions of the Memory Bingo game, and if Memory Bingo would continue to be offered as a regular activity after the study was completed. Social validity of the intervention appeared to be high in that the activity coordinator reported that residents enjoyed Memory Bingo and that they would continue to use Memory Bingo in the

future because staff enjoyed it and residents appeared more engaged during this activity.

### Discussion

The data from this study supported the hypothesis that greater amounts of active engagement would be observed during the Montessori-based activity in persons with dementia compared

to activities typically offered in the long-term care facility. This finding is also consistent with existing studies investigating similar research questions [1,2]. It is possible that Memory Bingo and other Montessori-based activities have been found to produce more active engagement because they are designed to compensate for deficits commonly observed in individuals with dementia (e.g., working memory deficits, executive functioning deficits), thereby making activities more accessible and enjoyable. In addition, Memory Bingo may be particularly engaging because it is similar to the game of Bingo, which is quite popular and familiar to many older individuals.

Unlike existing studies and contrary to expectations, there were no differences between Memory Bingo and typically-offered activities in terms of positive affect. This finding is difficult to explain, but one reason may be that individuals with moderate to severe dementia show fewer overt signs of positive affect, particularly when compared to non-demented individuals [12]. Also, apathy, which is in part defined by reductions in emotional expression, in persons with Alzheimer's disease is relatively common (present in 25-50% of cases) [10]. Unfortunately, the hypothesis regarding differences in negative affect could not be adequately tested due to the infrequency of this behavior.

One strength of this study was the emphasis on maximizing external validity so as not to place extra demands on staff and not disrupt normal unit routines. For example, no constraints were placed on staff in terms of who participated in an activity, who led activities, and when activities were conducted. Also, although staff was given rules and instructions for playing Memory Bingo, staff was allowed to make adjustments as needed. This emphasis on maximizing external validity may explain why staff had such a positive response to the study's procedures and to the Memory Bingo activity. An additional strength of this study is that it took an empirical approach to determining which activities "work" in terms of producing positive responses from residents. Developing activity programs that residents enjoy can involve a great deal of trial and error, but some of this guesswork can be taken out of activity programming by systematically collecting data to determine which activities residents prefer.

Limitations of this study include the small sample, the location of the long-term care facility, the limited variety in typically-offered activities, and the limited available times to observe participants. The small sample and the fact that the study was conducted in only one facility in the Midwest makes generalization of these findings to the larger population of persons with dementia premature. Because of scheduling constraints, only three different typically-offered activities were observed during the baseline phases of the study and these observations were made at the same times and same days of the week. Observing a broader range of activities at various times throughout the day would provide a more representative sample of typically-offered activities. Finally, the observation procedure limited the amount of data that could be collected in that participants were not continuously observed throughout activities which could have resulted in missing instances of behaviors of interest.

## Conclusions

The benefits of structured activities can include promoting physical health, providing cognitive and social stimulation, and reducing the occurrence of behavioral problems. Activities on memory care units can also provide positive, enjoyable experiences for individuals who suffer from dementia, thus possibly improving

overall quality of life. Findings indicate that Memory Bingo may help create these enjoyable experiences and contribute to improved quality of life. There is a need for new activity programs that are interesting, engaging, and appealing to this population. Montessori-based activities, such as the one investigated in this study, represent a promising alternative to activity programming that can result in increased enjoyment and participation in persons with dementia. However, future studies with larger, more diverse samples and that sample a greater variety of typically-offered activities will need to be undertaken to further validate these findings as well as address the limitations present in this study.

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