

# Using Choice-Making Opportunities to Increase Activity Engagement in Individuals With Dementia

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Structured choice-making procedures, referred to as preference assessments, have been frequently used to identify reinforcers for individuals with developmental disabilities; however, few studies have examined the use of preference assessments with older adults with dementia. This study evaluated the utility of 4 versions of a 2-choice preference assessment for identifying items and activities associated with high levels of engagement in clients at an adult day care program. The same 8 items were presented in 4 formats (ie, verbal, pictorial, textual, tangible), and items from each assessment were ranked with respect to the subsequent level of participant engagement with each item. Correlations were computed between the preference

hierarchy and subsequent engagement levels for each format. The format with the highest correlation coefficient was subsequently used in interventions in which frequent structured choice opportunities were presented throughout the day to increase engagement. For 3 of 4 participants, the vocal modality was optimal, while the tangible modality was optimal for the fourth. Moderate to substantial increases in engagement were observed for all participants when structured choices were offered. Implications for activity engagement in adult day care programs are discussed.

**Keywords:** dementia; preference assessment; engagement; choice; adult day care

Individuals with dementia often initiate and engage in fewer of their formerly preferred leisure activities as their cognitive impairments progress.<sup>1</sup> Low levels of activity engagement by clients is often explicitly targeted for programming in dementia care settings to promote higher quality of life.<sup>1</sup> Several studies illustrate that relatively simple interventions can increase levels of engagement of older adults in nursing homes.<sup>2-4</sup> For example, Jenkins et al<sup>2</sup> increased client engagement with a simple intervention of increased presentation of leisure materials and prompts for engagement. A choice of 4 leisure activities was presented several times during 2-hour periods twice a day, with praise and interaction contingent on engagement. The number of participants in the lounge area tripled during intervention,

and the number of residents engaging in activities increased as well.

In 2 studies, Mathews and colleagues targeted engagement in nursing homes using organizational interventions targeting staff performance. Engelman et al<sup>4</sup> used a resident check-in procedure wherein staff made personal contact with each resident every 15 minutes, provided praise for specific behaviors, and offered a choice of at least 2 activities if a participant was not engaged. The check-in procedure increased appropriate engagement of 5 participants from 41% of intervals in baseline to 81% of intervals in intervention, with a corresponding increase in the variety of activities. Altus et al<sup>3</sup> increased engagement from a pretreatment level of 11% to 44% by having staff log resident engagement and having supervisors provide positive feedback to staff.

Recently, Camp et al<sup>5</sup> described an evaluation of a Montessori-based intergenerational program on the engagement of adults with dementia. The program consisted of 20-minute sessions in which

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dyads of adults aged 50 to 95 years with a diagnosis of dementia and children aged 2.5 to 5 years worked on Montessori activities. Results indicated that the adult participants showed increases in constructive engagement and pleasure as well as decreases in passive engagement (eg, watching) and nonengagement.

Active engagement can clearly be increased for individuals with dementia, but previous studies have not attempted to determine if the offered activities were highly preferred by the consumers.<sup>2-5</sup> Knowledge about an individual's preference for a given activity or leisure item might increase the effects of interventions designed to increase engagement. Presentation of preferred activities might result in higher levels of engagement than presentation of nonpreferred activities, and engagement may persist longer and with fewer staff prompts if individual preference is considered when offering choices. Thus, experimental evaluations of the impact of preferences on engagement levels of individuals with dementia are needed despite the difficulties in assessing preferences of individuals with limited communication skills. One study has used an informant measure, the Pleasant Events Schedule–Alzheimer's Disease (PES-AD),<sup>6</sup> which surveys a caregiver about activities previously enjoyed by his or her loved one. This tool has acceptable psychometric properties<sup>7</sup> and purports to identify items or activities that could be provided to increase engagement; however, no studies have directly examined the predictive utility of the PES-AD for identifying stimuli that actually result in increased engagement.

Another option for examining preferences in individuals with limited communication skills is the use of direct observation of selection responses during structured choice-making procedures, which are termed *preference assessments*. Recently, Staal et al<sup>8</sup> presented an overview of an extensive literature on direct preference assessment procedures, initially developed for individuals with developmental disabilities and severe communication impairments, that might be valuable for use with individuals with dementia. Preference assessments involve presentation of specific items and measurement of orientation to or engagement with those items as an index of individual preference. Studies have examined whether leisure items are best presented in isolation,<sup>9</sup> in pairs,<sup>10</sup> or in a 6- to 10-item array.<sup>11</sup> Paired presentations and array presentations involve a choice between concurrently available items and generally result in clearer differentiation of preference.<sup>10,11</sup>

The paired stimulus format has high predictive utility in identifying items that can be used as reinforcers or engagement items in subsequent interventions for individuals with developmental disabilities.<sup>12,13</sup>

Recent studies have attempted to determine whether the modality or format of the stimulus presentation affects the utility of results.<sup>14-16</sup> Most comparative studies have used presentation of actual items (ie, tangible preference assessment), which is considered the gold standard procedure, and presentation of pictures of items, which is a much more convenient presentation format. Parsons et al<sup>16</sup> compared tangible and pictorial preference assessments in older adults with severe developmental disabilities and found demonstration of a clear preference in the tangible assessment but not in the pictorial assessment for 5 of the 7 participants. Similarly, Higbee et al<sup>14</sup> found that a tangible preference assessment predicted reinforcers more accurately than a pictorial assessment did when actual items were not provided immediately following the selection.

Conyers et al<sup>17</sup> compared 3 presentation formats for choice making in individuals with developmental disabilities. The same items were assessed using tangible, pictorial, and spoken/verbal formats. They consistently found that the tangible presentation format resulted in a more accurate identification of preferences and that the effectiveness of a given presentation format was related to a participant's discrimination skills as measured by the Assessment of Basic Learning Abilities (ABLA).<sup>18</sup> Individuals passing lower ABLA levels made discriminations with tangible items, but only individuals passing the higher levels of the test could effectively make choices using 2-dimensional pictures or spoken (auditory) presentation, a finding that has since been replicated.<sup>19</sup>

The current study was designed to investigate whether directed preference assessments would result in more recognizable preferences for elders with dementia, thus providing opportunities for increasing engagement. We directly compared 4 presentation formats to determine which would result in choices highly correlated with actual engagement. Top-ranked items from each format of preference assessment were compared to determine which assessment best predicted actual engagement. A second phase of the study involved evaluation of the impact of applied preference assessment information on the engagement of individuals with dementia; more concisely, the format that best predicted activity engagement was evaluated in an intervention designed to increase engagement.

## Method

### Setting and Participants

The study was conducted at an adult day care program for older adults with cognitive, physical, and medical disabilities. The program was designed to provide leisure activities and medical services as well as respite for family care providers. Group activities were scheduled daily, and various individual activities were available, with an average staffing of 3 to 4 participants to 1 staff member. Most participants in the program had high levels of engagement under this arrangement, but 4 older adults who consistently exhibited no engagement or engagement in only 1 activity each week were nominated by staff to participate.

Two measures of cognitive skills were administered prior to participation as a screening process. The Mini-Mental State Examination (MMSE)<sup>20</sup> is a common measure of cognitive status, with a potential score of 30. Scores of 21 or lower are indicative of substantial cognitive impairment. The ABLA<sup>18</sup> is a criterion-referenced assessment developed for individuals with moderate to profound developmental disabilities to measure performance on 5 types of discrimination tasks: simple imitation, position discrimination, visual discrimination, visual matching to sample, and auditory-visual discrimination. Performance is described in terms of the highest level mastered, with levels numbered from 1 to 4 and 6.

Bob was a 62-year-old Caucasian man with severe aphasia (ie, inability to produce spoken language) and right-side hemiparesis due to prior cerebral vascular accident (ie, stroke). His score on the MMSE was 7, indicating severe cognitive impairment. He successfully completed levels 1 to 4 of the ABLA, indicating he could make visual discriminations and match to sample. He demonstrated minimal verbal communication due to articulation difficulties and some limited gestures.

Jim was an 89-year-old Caucasian man with diagnoses of dementia (probable Alzheimer's type and multi-infarct dementia) and traumatic brain injury acquired in a motor vehicle accident. He was able to communicate using spoken language and scored an 8 on the MMSE, indicating severe cognitive impairment. He successfully completed all levels of the ABLA, indicating that he could make visual discriminations and auditory-visual discriminations.

Phillip was an 86-year-old Caucasian man with a diagnosis of dementia (probable Alzheimer's type)

who could communicate using spoken language. He scored 17 on the MMSE, indicating moderate to severe cognitive impairment. An unusual performance pattern was observed on the ABLA for this participant. Higher levels are typically not administered to individuals with developmental disabilities when lower levels have been failed because data support the hierarchical nature of acquisition of these skills.<sup>21</sup> However, we continued to administer higher levels when level 3 was not passed because dementia patients often exhibit an uneven pattern of skill loss as their dementia progresses and they have a history of successful discrimination with all of these skills. The patient successfully completed levels 1, 2, 4, and 6 but did not pass level 3, suggesting difficulty with learning tasks that involve visual discriminations with tasks that change position periodically but success on tasks requiring auditory-visual discrimination.

John was an 84-year-old African American man with diagnoses of dementia (probable Alzheimer's type) and depression. He could communicate using spoken language and scored 17 on the MMSE, indicating moderate to severe cognitive impairment. John successfully completed all levels of the ABLA, indicating that he could make visual discriminations and auditory-visual discriminations.

## Experiment 1: Preference and Engagement Assessments

### Preference Assessments

*Interviews.* Three interviews were used to generate 8 activities for subsequent preference assessments: the PES,<sup>22</sup> the PES-AD,<sup>6</sup> and the Reinforcer Assessment for Individuals With Severe Disabilities (RAISD).<sup>23</sup> The PES is a 46-item structured interview questionnaire administered to the older adults in interviews using a yes/no response format. The PES-AD is a 53-item interview administered with the primary caregiver of a person with dementia. The RAISD is a structured interview administered with the primary caregiver that was initially designed for use with individuals with developmental disabilities.

*Paired stimulus preference assessments.* The same 8 items were presented in 4 paired stimulus preference assessments using the procedures outlined by Fisher et al.<sup>10</sup> Each item was presented in a pair with every other item in random order until all possible combinations had been presented. Four stimulus presentation

modalities were compared: tangible, vocal, pictorial, and textual. Although the test has not been used in previous comparative studies, individuals with dementia may retain sight-reading skills when other language skills falter.<sup>24</sup>

The order of preference assessments was randomly selected for each participant. Within each preference assessment, the order of item presentation was randomized. The position was alternated across trials to control for recency or position effects (ie, first/last mention for the verbal condition, left/right for other conditions). For the individual with hemiparesis, the 2 stimuli were presented on the nonaffected side, with 1 item directly above the other and rotation of the top/bottom item. Selection was defined as saying the name of the item or pointing to the stimulus, and a selection resulted in access to that stimulus for 45 seconds.

In the vocal format, participants were asked, "Would you rather [activity A] or [activity B]?" In the tangible format, items were placed at equal distance directly in front of the participant, who was asked to "pick one." In the textual format, two 4- × 6-in. cards with names of activities printed in 85-pt Times New Roman bold font were presented at equal distance directly in front of the participant with the instruction to "pick one." In the pictorial format, two 4- × 6-in. pictures of activities were placed at equal distance directly in front of the participant, with the instruction to "pick one."

### Analogue Engagement Assessment

Each item that was highest ranked or tied for the highest rank for any of the assessments was included in the subsequent engagement assessment. Sessions were 15 minutes in duration, and 2 to 4 sessions were completed each day in the general activity area of the day program. The order of conditions was randomized, and conditions were compared using a multielement design. Each condition was replicated 3 times. If sessions were prematurely terminated for toileting or medical needs, sessions including at least 10 minutes were retained and shorter sessions were conducted again in their entirety. No reinforcement was provided for engagement in any condition, but the therapist remained in the general area.

*Preferred item conditions.* Each top-ranked stimulus was presented in a separate condition. The therapist approached the participant with the item/activity

and said, "Here is \_\_\_\_, you can \_\_\_\_ for as long as you want. Let's get started," and placed the item in his hand or next to him as appropriate.

*Control condition.* This condition represented the typical arrangement of the day program, in which activities could occur but with no programmed choices of specifically identified items. Various items and activities not included in other sessions were available nearby, but no specific item presentation occurred.

### Dependent Measures and Interobserver Agreement

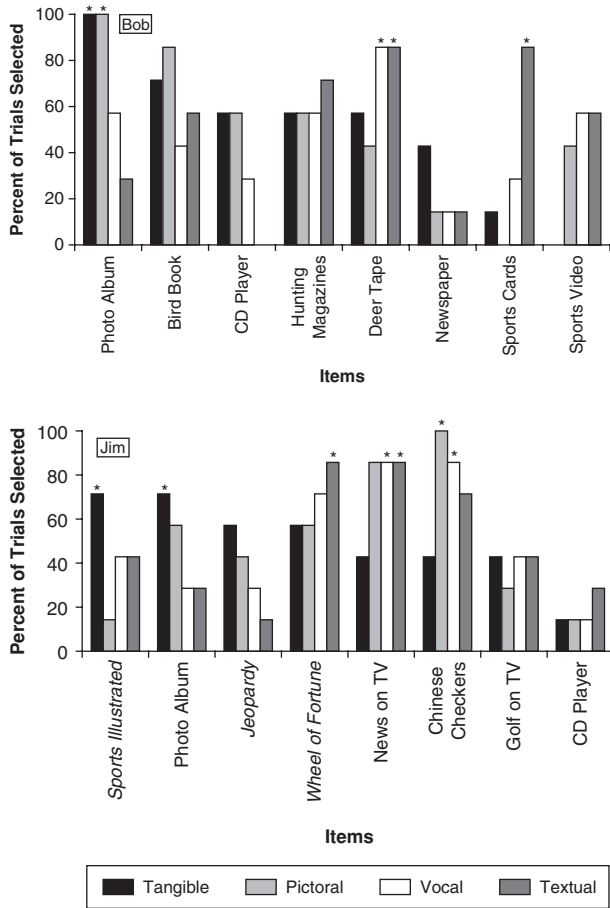
Observers scored each pair presentation in the preference assessments by marking whether selection occurred and which item was selected. A second independent observer scored 62.5% of the trials, and an agreement was defined as 2 observers marking the trial identically (eg, same stimulus selected, no stimulus selected). Interobserver agreement (IOA) was calculated as agreements were divided by (agreements + disagreements) and multiplied by 100. Overall agreement was 100%.

For engagement analyses, data were collected on engagement using a 15-second partial interval recording system and an auditory cue to indicate the beginning of each interval. An interval was scored as engaged when the person actively manipulated the item or looked at the materials (eg, magazines, videos) for at least 2 consecutive seconds. A second observer scored 100% of sessions for all participants. Each interval was scored as an agreement if both observers scored the interval exactly the same. IOA was calculated using a point-by-point method in which agreements were divided by (agreements + disagreements) and multiplied by 100. Average agreement across participants was 98%.

*Correlation analysis.* For each participant, Pearson correlation coefficients were calculated for the percentage of engaged intervals, and selection percentages for all items were included in the engagement analysis for each preference assessment format.

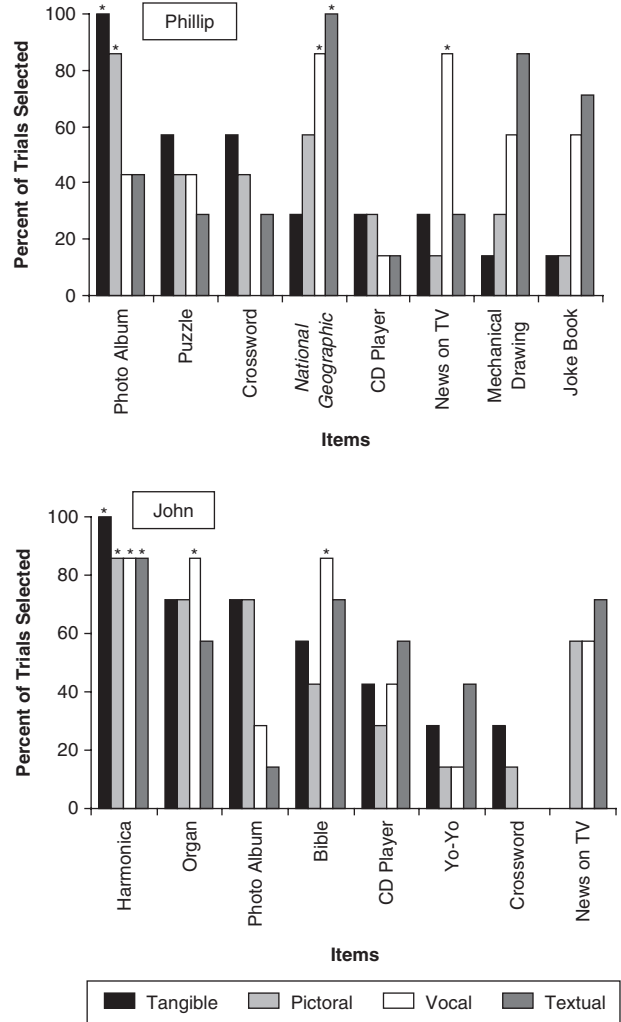
### Results

The preference hierarchies for each participant are presented in Figures 1 and 2, with the top-ranked stimulus for each modality denoted by an asterisk over



**Figure 1.** Percentage of presentation trials in which each item was selected in 4 preference assessments for Bob (top) and Jim (bottom). Top-ranked items for each preference assessment are designated by an asterisk.

the relevant bar. Preference hierarchies varied greatly across modalities, with different formats resulting in different top-ranked stimuli. Three different stimuli had the highest percentage of trials selected by 1 or more of the assessments for Bob (Figure 1, top), with the photo album identified by the pictorial and tangible assessments, a deer hunting video identified by the vocal and textual assessments, and sports cards identified by the textual assessment. Five different stimuli were identified for Jim (Figure 1, bottom), with Chinese checkers identified by both the pictorial and vocal assessments, news on television identified by the vocal and textual assessments, *Sports Illustrated* magazine identified by the tangible assessment along with a photo album, and *Wheel of Fortune* identified in the textual format. Three stimuli were identified for Phillip (Figure 2, top), with a photo album identified by both the pictorial and



**Figure 2.** Percentage of presentation trials in which each item was selected in 4 preference assessments for Phillip (top) and John (bottom). Top-ranked items for each preference assessment are designated by an asterisk.

tangible assessments, *National Geographic* magazine identified by the vocal and textual assessments, and news on television identified by the vocal assessment. Finally, for John (Figure 2, bottom), the agreement between assessments was high for the top-ranked items, with a harmonica identified by all 4 assessments and an organ and the bible also identified by the vocal assessment method.

The subsequent engagement analyses results are presented in Table 1 as the average percentage of intervals of engagement for each condition for each participant. These averages were then correlated with the percentage of trials in which each item in the analysis was selected in each of the 4 preference

**Table 1.** Average Percentage of 15-Second Intervals With Engagement for Each Item

Item/Condition	Participant			
	Bob	Jim	Phillip	John
Photo album	46.4	55.3	73	
Deer hunting video	94			
Sports cards	33.7			
Chinese checkers		11		
News on TV		50.3	81.66	
<i>Sports Illustrated</i>		59		
<i>Wheel of Fortune</i>		92.3		
<i>National Geographic</i>			87.66	
Harmonica				100
Organ				96.8
Bible				100
Control	65.3	21.7	31	0

assessments (see Table 2). For each participant, one of the preference assessments was clearly more predictive of engagement than the other preference assessments. Very strong correlations were found between the vocal preference assessment and subsequent item engagement for 2 participants: Bob ( $r = 0.95$ ) and Phillip ( $r = 0.92$ ). For Jim, a moderate correlation ( $r = 0.45$ ) was found between the tangible preference assessment and subsequent item engagement. For John, a correlation coefficient could not be calculated between engagement and the vocal assessment because all items had equal values for the selection variable (ie, no variance). Instead, we calculated an average difference score between the percentage of intervals of engagement and the percentage of times selected for each item for each type of assessment. The vocal assessment had the lowest average difference score at 13.2.

## Experiment 2: Intervention

An intervention was conducted in the common area of the day program in two 1½-hour blocks each day (prior to and after lunch) to determine if regular, frequent choices would increase participant engagement. Phillip was no longer in the program because of health issues, but Bob, Jim, and John participated. Baseline and intervention conditions were compared using a multielement design, with each day consisting of 1 of the 2 conditions.

*Baseline.* Regularly scheduled activities were available. Specific choices of items were not consistently

**Table 2.** Correlation ( $R$ ) Between Preference Assessment Percentage Selections and Percentage of 15-Second Intervals With Item Engagement for Bob, Jim, and Phillip and Average Difference Between Selection Percentage and Percentage of Intervals With Item Engagement for John

Participant	Pictorial	Vocal	Tangible	Textual
Bob	0.12	<b>0.95</b>	0.20	0.31
Jim	-0.57	-0.30	<b>0.46</b>	0.10
Phillip	-0.50	<b>0.91</b>	-0.92	0.68
John	32.2	<b>13.2</b>	22.7	27.5

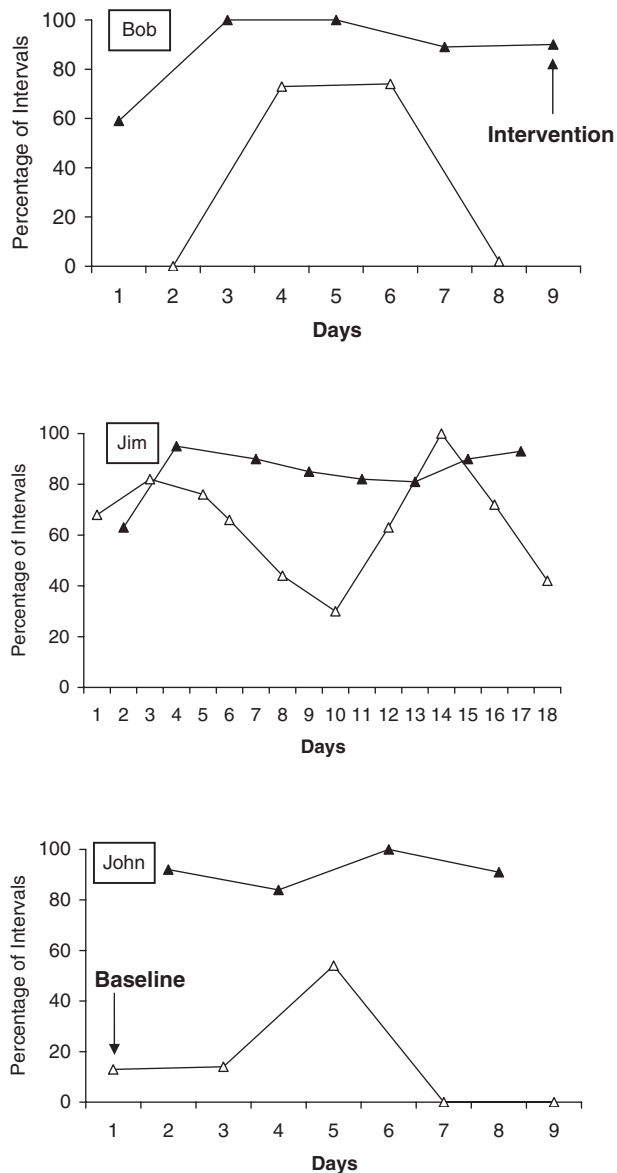
The highest correlation or lowest difference score for each participant is bolded to identify the best modality.

offered, but leisure items were available, and group activities occurred on a daily basis.

*Intervention.* Participants were offered 2 items using the modality identified in the previous experiment. One of the 4 highest ranked items was presented with 1 of the 4 lower ranked items, and highly ranked items were rotated across the hour. Staff approached the participant and said, "Would you rather have your \_\_\_\_ or \_\_\_\_?" (vocal modality) or "pick one" while holding up 2 stimuli (tangible). The selected activity was immediately provided with the statement, "I am glad you made a choice. Here is your \_\_\_\_; you can have it for as long as you want." If the participant did not make a choice, the staff said "OK," remained in the area, and offered a different choice 15 minutes later if the participant was not engaged. If the participant was engaged 15 minutes later or was indisposed (ie, bathroom), staff would offer a choice when the participant stopped the activity or returned to the area.

## Data Collection and IOA

Data were collected on engagement using a continuous partial interval recording system for each 1-minute interval. Engagement was scored if the person actively manipulated or looked at the preferred item(s) or materials for at least 5 continuous seconds of the interval. Data collection was discontinued when a participant was indisposed (ie, in bathroom). A second independent observer scored a portion of the intervals, and each interval scored exactly the same by both observers counted as an agreement. IOA was calculated by dividing agreements by total intervals and multiplying by 100%.



**Figure 3.** Percentage of 1-minute intervals with engagement during baseline (open triangles) and intervention (closed triangles) for Bob (top), Jim (middle), and John (bottom).

IOA was assessed for 54% of observations for Bob, with an agreement of 98%; 54% of observations for Jim, with agreement of 99%; and 38% of observation intervals for John, with a 99% agreement.

The results of the intervention analyses are depicted in Figure 3. During baseline days, Bob (top) was engaged during an average of 37% of intervals, while the intervention resulted in an average of 88% of intervals engaged. Jim's average engagement (middle) during baseline was 64% of intervals while the average engagement during the intervention was 74% of intervals,

with most treatment data points above baseline data points and less variability in engagement during treatment days. John's average level of engagement (bottom) during baseline was 16% of intervals, increasing to 92% of intervals during the intervention.

## Discussion

This study examined 4 formats for assessing preferences of older adults with dementia during direct observation of choice making and replicated the effects of previous applied studies of offering choices as a means to increase activity engagement.<sup>2-4</sup> For 3 of the 4 participants, the vocal modality was the best format for offering choices. This finding was surprising because program staff asked participants about the willingness to engage in activities every day and because tangible preference assessments have consistently been most predictive with other populations.<sup>25</sup> It is likely that the format of the verbal preference assessment (ie, "Do you want X or Y?") was a more effective way to structure activity choices than open-ended questions (ie, "What do you want to do today?") or yes/no questions. The tangible format was most predictive for Jim, which aligns with findings with other populations. Unlike previous studies, performance on the ABLA was not clearly associated with predictive utility of stimulus presentation format. Bob was unable to pass level 6 of the ABLA but responded most accurately to the verbal format, while Jim passed all levels of the ABLA but responded most accurately to the tangible format.

Differential preference for leisure items resulted in correspondingly different levels of activity engagement during the engagement analysis, and incorporation of choices of those items resulted in increases in engagement over baseline. Clear intervention effects were observed for Bob and John, with modest effects for Jim. All 3 participants had been recommended because of low engagement, yet Jim showed relatively high rates of engagement on baseline days by the time the intervention analysis began, illustrating the importance of the alternating treatments design. Anecdotally, it appeared that changes in the staff and new program participants resulted in an increase in engagement for Jim. Still, engagement on intervention days was more stable and higher than engagement on baseline days, indicating an effect of structured choice opportunities.

In summary, this study examined the effectiveness of 4 different modalities of a paired choice preference

assessment with 3 individuals with dementia and 1 individual with aphasia at a local day care program. Participants responded differently to choices presented in various presentation formats, but a format correlated with actual engagement could be identified for each person. The analogue analysis illustrates a method for determining the best format for offering activity choices to individual elders, and the intervention analysis illustrates the benefits of choice-making opportunities throughout the day. Future research should examine the stability of preferences over the course of progression of dementia. It is possible that preferences might change or that preferences remain stable, but different procedures are required to accurately assess those preferences at different stages of dementia.

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