Spring 2017

Evaluating Preference Stability Among Individuals with Alzheimer's Disease

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A Thesis
By
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Submitted to the Faculty of the Department of Health Professions
at Rollins College in Partial Fulfillment
of the Requirements for the Degree of

MASTER OF ARTS IN APPLIED BEHAVIOR ANALYSIS AND CLINICAL SCIENCE

May, 2017
Winter Park, FL

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Abstract

In the behavior-analytic field, preference assessments are conducted to determine specific items to use as reinforcers to reduce aberrant behavior as well as increase appropriate behavior. We examined the consistency of preference-assessments results among individuals with Alzheimer's Disease (AD) to ensure effective reinforcers are used in behavioral interventions. Specifically, we examined if identified reinforcers remained consistent for individuals with AD throughout the study or if preferences shifted. The experimental procedure consisted of a series of multiple-stimulus preference assessments without replacement (MSWO); data were analyzed for preference shifts. Results showed variability with one individual's preferences, whereas the other individual's preferences remained relatively stable.

Keywords: Alzheimer's Disease, gerontology, preference assessment

Introduction

Dementia is an umbrella term used to describe a variety of behavioral and cognitive symptoms. The Alzheimer's Association (2015) describes Alzheimer's Disease (AD) as the most common form of dementia (60-80% of dementia cases); other types of dementia include vascular dementia, Parkinson's Disease, and Korsakoff Syndrome. Alzheimer's Disease is not confined to one area of the brain; in most cases, the cortex, hippocampus, and ventricles of the brain associated with thinking and remembering are affected (Corsellis, 1970). Alzheimer's Disease gradually deteriorates an individual's cognitive skills (e.g., remembering names, places, and events), social skills (e.g., language), and independent-living skills (e.g., functional independence with money or household responsibilities). Alzheimer's Disease is commonly known as a disease of old age; however, 5% of AD cases are early onset affecting individuals in their 40s and 50s (Alzheimer's Association, 2015).

According to the Alzheimer's Association (2015), last year alone an estimated 5.3 million Americans suffered from AD. Alzheimer's Disease is increasing in prevalence; it is estimated that, by 2025, AD will affect almost 13.8 million Americans (Alzheimer's Association, 2015). These statistics are particularly relevant because of the expected increase in the elderly population. By the year 2030, nearly 20% of Americans will be age 65 or older (Behavioral Gerontology Special Interest Group, 2016). The number of Americans with AD is expected to increase concurrently with the rise of the elderly population.

Alzheimer's Disease is associated with common cognitive and behavioral symptoms. Cognitive symptoms include amnesia (memory loss), aphasia (the inability to effectively communicate), apraxia (the inability to perform daily life activities), and agnosia (inability to correctly recognize the five senses; Sourander & Sjogren, 1970). Behavioral symptoms include

increased problem behavior such as irritability, inappropriate vocalizations, and aggression (Alzheimer's Association, 2015).

Alzheimer's Disease progresses through three stages without remission: mild, moderate, and severe. Symptoms worsen as the disease advances (Sourander & Sjogren, 1970). In the mild stage, behavioral and cognitive symptoms might consist of an individual forgetting names, personal events, and personal information; however, an individual might still function independently (Alzheimer's Foundation of America, 2016). Symptoms during the moderate stage of AD might consist of more observable cognitive impairments including confusion, not being able to recognize familiar family members, and more trouble performing daily activities and tasks. During this stage, an individual might require more assistance during the day compared to a typical elderly individual, and functional independence might decrease (Alzheimer's Foundation of America, 2016). The moderate stage is typically the longest stage (Alzheimer's Association, 2015). The severe stage of AD might involve individuals losing the ability to walk, swallow, sit, or communicate. During this stage, individuals might lose all functional independence and need around-the-clock care (Alzheimer's Association, 2015).

No cure has been discovered for AD; however, treatments have been developed to ameliorate cognitive and behavioral symptoms (Alzheimer's Foundation of America, 2016). These treatments include medications and non-drug approaches such as cognitive treatments and behavior therapy (Alzheimer's Association, 2015). Behavior therapy within the field of behavioral gerontology involves the practice of applying behavior-analytic approaches to problems encountered by adults in later life (Behavioral Gerontology Special Interest Group, 2016). With the elderly population estimated to increase, behavioral gerontology is an important area for future research. Behavioral-gerontology research could help educate behavior analysts,

nurses, physicians, and caregivers on effective techniques to care for those with AD. To date, behavior-analytic research with an aging population has been conducted in the areas of prompting (Engleman, Altus, Moiser, & Matthews, 2003), functional analyses and treatments (Baker, Hanley, & Matthew, 2006; Buchannan & Fisher, 2002), and preference assessments (Ortega, Iwata, Nogales-Gonzalez & Frades, 2012), all of which are discussed below.

Review of Literature

Research Outside of Behavior Analysis

Pharmacological treatments. As previously mentioned, there is no cure for AD. Medications prescribed by doctors do not stop brain damage caused by AD; they only help the body slow down symptoms. Cholinesterase inhibitors and mematine are two popular medications specifically used to treat AD (Kelly, Harvey, & Cayton, 1997). Donepezil (a type of cholinesterase inhibitor), approved in both the United States and United Kingdom, was the first licensed drug for AD (Kelley et al., 1997). Aricept is a Food and Drug Administration (FDA) approved drug for all stages of AD. Exelon and razadyne are FDA-approved drug treatments for the mild to moderate stages of AD. Side effects for these drugs include vomiting, nausea, loss of appetite, and frequent bowel movements. Namenda and namzaric are FDA-approved drugs for moderate and severe stages of AD. Side effects for these drugs include headaches, constipation, bruising, confusion, and dizziness (Alzheimer's Association, 2015). The drugs described above are commonly prescribed to improve memory loss, effective communication, daily living skills, and the ability to recognize sensations (Alzheimer's Association, 2015). Some drugs commonly prescribed for behavioral symptoms include antidepressants, lorazepam, and risperdal. These drugs are administered to reduce irritability, disruptive vocalizations, and aggression (Alzheimer's Association, 2015).

Environmental manipulations. Some prior gerontology research has focused on altering the emotional state of individuals with AD (Singh, Subhan, Krishnan, Edwards, & Okeke, 2016; Moffat, Baker, Pinkhey, Garside, & Freeman, 1993). Singh et al. (2016) assessed loneliness among elderly individuals with mild to moderate dementia living in two hospital settings (i.e., individuals living in private rooms and those with roommates). The authors administered a variety of direct and indirect assessments consisting of scales, surveys, and interviews to assess subject loneliness, primarily collecting self report data. Results indicated individuals had higher levels of loneliness if they were living in single rooms as opposed to living with roommates. The authors suggested these results might be helpful when designing new floor plans for hospitals or activities for the elderly population. Behaviorally, these results are socially relevant by suggesting more social interaction might be preferred for hospitalized individuals.

Moffat et al. (1993) filled a room with various equipment to stimulate different senses to increase happiness in individuals with moderate to severe dementia. Equipment within the "sensory room" consisted of a projector, disco ball and spotlight, music, bubble tube, bubble machine, side glow fiber optic spray, aroma diffuser, and vibrating cushion. (This arrangement seems to resemble an environmental-enrichment procedure used in behavior analysis; e.g., Horner, 1980.) Staff members indirectly measured individuals' emotions, specifically happiness, before and after each exposure to the sensory room through self reports of the individuals. Two weeks later, the authors measured item engagement (i.e., how long an individual engaged with an item) while in the sensory room through a two-way mirror as a more direct measure of behavior. Individuals that displayed lower engagement levels exhibited higher rates of depression, agitation, or a reduced quality of life (Lewinsohn & Graf, 1973). Moffat et al. found individuals remained engaged while in the sensory room and reported an increase in happiness across

sessions of exposure to that enriched environment relative to before exposure in the sensory room.

The previously described treatments aimed to alter the emotional states of individuals with dementia. Symptoms such as loneliness, happiness, and calmness, however, are only as valid as the method of assessment used. Behavior-analytic research focuses on observable behavior rather than cognitive, mentalistic symptoms. For example, happiness could be considered a more behavioral measure relative to a more cognitive measure if defined by an observable measure of facial expression or vocalizations (Moore, Delaney, & Dixon, 2007). Moore et al. (2007) examined happiness in individuals with AD in the form of activities by direct observation. These activities included going to an ice-cream parlor, an outdoor farm, or *engagement*, which consisted of singing, completing puzzles, or conversations with others. The engagement period was individualized based on caregiver report on the individual's preference. Data on happiness were collected prior (10 min), during, and after activities (10 min and 60 min). Individuals were exposed to all activities for 5, 10, and 20 min in a counterbalanced order. Happiness, measured by smiling, laughing, or yelling while smiling, increased during all activities and during the 10-min post-activity observation. A focus on observable behavior over self report improved the objectiveness of this experiment related to emotion, leading to higher validity.

Research Within Behavior Analysis

Trahan, Kahng, Fisher, and Hausman, (2011) reviewed behavior-analytic research conducted with a geriatric population found in the *Journal of Applied Behavior Analysis* (JABA). The authors then described different phases of behavioral-gerontology literature. Trahan et al. stated that, from 2007 to 2011, only four out of 300 published articles in *JABA* related to

individuals with the diagnosis of dementia, each of which is described in more detail below. Two of these articles used prompting to increase engagement among elderly individuals with dementia (Brenske, Rudrud, Schulze, & Rapp, 2008; Moore et al., 2007). The other two articles related to functional analyses and treatments of problem behavior (Baker et al., 2006; Dwyer-Moore & Dixon, 2007). Trahan et al. highlighted the importance of the need for gerontology research and suggested both overall and specific future research in this field.

Prompting. Prior researchers have trained nursing staff to implement behavior-analytic prompting (Brenske et al., 2008; Engleman et al., 2003) to increase the appropriate behavior of individuals with dementia. Because memory loss is a common symptom of dementia, levels of attendance at activities or engagement in activities might be lower among this population due to forgetfulness. For example, an individual might forget what he or she was doing during that moment which could translate to low levels of engagement. Engleman et al. (2003) trained certified nursing assistants (CNAs) to implement least-to-most prompting strategies to promote more independence with daily living skills among patients with dementia. Results suggested all CNAs were able to promote active involvement in individuals' personal-care routines to increase independence. Further, all CNAs were able to deliver graduated prompts and praise appropriately. Brenske et al. (2008) used verbal prompts within a reversal design to increase activity attendance and engagement. Simply through teaching effective prompting, we could increase functional independence and activity attendance among the AD population.

Functional analyses and treatments. Functional analyses (FAs) are assessments used to determine the variable(s) maintaining a behavior (Iwata, Dorsey, Slifer, Bauman, & Richman, 1994). Maintaining variables could consist of automatic reinforcement, attention, escape or access to leisure or edible items. In an FA, an individual is exposed to different conditions that

might evoke problem behavior, resulting in a more accurate conclusion regarding the variables maintaining behavior compared to other types of assessments (e.g., indirect or direct assessments; Camp, Iwata, Hammond, & Bloom, 2009).

Functional analyses are common within behavior-analytic research and are becoming more common within the field of behavioral gerontology specifically (Baker et al., 2006; Buchannan & Fisher, 2002; Dwyer-Moore & Dixon, 2007). Baker et al. (2006) trained a CNA to conduct an FA of the aggressive behavior of a 96-year-old woman with dementia. Functional analyses results showed escape was the maintaining contingency for aggression. The authors implemented noncontingent escape within a reversal design and found it to be an effective treatment. Dwyer-Moore and Dixon (2007) conducted FAs of wandering and disruptive vocalizations with three elderly individuals with dementia. The authors identified that one individual's disruptive vocalizations were maintained by attention, a second individual's wandering also was maintained by attention, and a third individual's disruptive vocalizations were maintained by escape from demands. Function-based interventions were implemented for each problem behavior, resulting in a decrease in wandering and disruptive vocalizations for all three individuals. Further, Buchannan and Fisher (2002) conducted an FA and delivered noncontingent reinforcement in the form of attention and music as a treatment of disruptive vocalization of individuals with dementia.

Unlike the studies described above whose results showed problem behavior was maintained by social reinforcement, Locke and Mudford (2010) found one individual's vocalizations were maintained by automatic reinforcement. Following the FA, the authors used headphones with music to reduce vocalizations (presumably because the auditory stimulation served as a competing stimulus).

Preference assessments. In addition to research focused on prompting and the assessment and treatment of problem behavior, researchers have also examined preference assessments among a geriatric population. Preference assessments are beneficial in the field of behavior analysis because they identify preferred stimuli to be used for skill acquisition, teaching replacement behaviors, or reducing problem behavior. Preference assessments are conducted to evaluate a hierarchy of potential reinforcers. The types of preference assessments found in behavior-analytic literature include: single-stimulus preference assessments (SSPA; Pace, Ivancic, Edwards, Iwata, & Page, 1985), paired-stimulus preference assessments (PSPA; Fisher et al., 1992), free-operant preference assessments (FOPA; Roane, Vollmer, Ringdahl, & Marcus, 1998), multiple-stimulus preference assessments with replacement (MSW; DeLeon & Iwata, 1996) and multiple-stimulus preference assessments without replacement (MSWO; DeLeon & Iwata, 1996).

Pace et al. (1985) developed the SSPA where stimuli are presented individually and sequentially. The amount of engagement with each stimulus is recorded. After the individual rejects (or stops engaging with) that stimulus, a new stimulus is presented; this process continues until all stimuli have been presented. The item with which an individual engages the most is considered the most preferred. This assessment is commonly used when individuals have a difficult time choosing between two stimuli (Cooper, Heron, & Heward, 2007). The PSPA (Fisher et al., 1992) consists of presenting two stimuli simultaneously and instructing the individual to select one. The individual is allowed access to the selected stimulus for a specified amount of time. Each item is randomly paired with every other item across trials. Preference is determined based on the percentage of trials an item is selected.

Preference assessments such as the FOPA, MSW, and MSWO present an array of stimuli at once. The FOPA (Roane et al., 1998) consists of presenting all stimuli simultaneously and allowing the individual to engage with any or all of the item(s). The amount of engagement with each item is measured, and whichever stimulus has the greatest duration of engagement is considered to be the most preferred. DeLeon and Iwata (1996) developed multiple-stimulus presentation procedures for assessing preferences. The MSW consists of presenting several stimuli and prompting an individual to select one. Once a stimulus has been selected, an individual receives access to that stimulus for a specified amount of time, and the stimulus is placed back in the array. All stimuli are presented each trial. The only difference between the MSW and MSWO is that *with* replacement means the stimulus that was selected is placed back in the array of stimuli and presented again. In an MSWO, the selected stimulus is removed from the array following its selection. DeLeon and Iwata (1996) found even though both types of assessment are effective, the MSWO is more efficient, determining a hierarchy of preference in half the time of an MSW.

Preference Assessments Within Gerontology

Preference assessments have been employed within the geriatric population (Feliciano, Steers, Elite-Marcandonatou, McLane, & Arean, 2009; Mesman, Buchannan, Husfeldt, & Berg, 2011; Ortega et al., 2012; Raetz, Leblanc, Baker, & Hilton, 2013). Within this population, preference-assessment results have been used to determine preferred items (Mesman et al., 2011; Ortega et al., 2012), increase item engagement (Raetz et al., 2013), and decrease inappropriate behavior (Feliciano et al., 2009). Expanding on this research, Mesman et al. (2011) compared preference-assessment results to caregiver report of preferences. These authors implemented a PSPA with 10 stimuli identified by family members and caregivers as potentially preferred.

Caregivers and family members were asked to rate individuals' preferences of stimuli on a Likert-type scale. Authors found PSPA results did not match results obtained from the surveys. Ortega et al. (2012) implemented a PSPA with edible and leisure items with 14 individuals with mild to severe AD and found individuals with AD preferred leisure over edible items.

Feliciano et al. (2009) investigated the utility of preference assessments to inform interventions for depression and agitation, measured by indirect assessments, for 11 elderly individuals with dementia. These authors conducted a PSPA with preferred activities and provided the results to staff to incorporate the activities into patients' care plans. The preferred activities were used in the interventions by allowing access to these activities before and during aversive situations where problem behavior was known to occur. Results suggested increasing engagement with preferred activities resulted in decreased levels of agitation and depression as assessed by indirect assessments. This study demonstrates how finding the most highly preferred item can improve the quality of life among individuals with dementia.

Raetz et al. (2013) implemented a leisure-item MSWO with eight elderly individuals diagnosed with dementia. The items were selected based on results from a survey. Following the MSWO, an engagement analysis was conducted using the items ranked high, medium, and low. Each individual was given three 5-min sessions to engage with the items; the individual had the opportunity to terminate the 5-min sessions at any point. The authors compared results of the preference assessment to the engagement analysis. Results showed five individuals engaged more with high-ranked stimuli compared to low-ranked stimuli; two individuals had higher engagement with low-ranked stimuli, and one individual failed to complete any preference assessments. Further, only four individuals showed stable preferences throughout all sessions.

Statement of the Problem

With an impending increase in the elderly population and prevalence of AD, the need for more research in behavioral gerontology is growing. Because preferred items are often the key to many behavioral interventions, including those related to increasing appropriate behavior or decreasing inappropriate behavior (Feliciano et al., 2009), a better understanding of preference among this population is crucial. Research has shown adults with developmental delays have consistent preferences across months (Hanley, Iwata, & Roscoe, 2006). However, preference stability has not been examined in this population.

Preference stability among the AD population would likely be different than other populations. This population is unique because these individuals often suffer from memory loss. As a result, it is possible individuals with AD would have frequent shifts in preferences, changing the likelihood of being able to make progress with increasing appropriate skills or decreasing inappropriate behavior. We examined if identified reinforcers remained consistent among the AD population over the course of this study or if preferences shifted. We implemented a series of preference assessments to assess if preferences remained stable or shifted over several weeks.

Method

Individuals and Setting

Individuals were recruited from a local assisted-living facility in the Central Florida area. Three individuals with AD were recruited. Unfortunately, early in the study, one individual passed away. Therefore, this study included two individuals, Mary and Pat. Both Mary and Pat lived in the same assisted-living facility where they needed assistance in walking, standing up, and sometimes eating. Mary and Pat were both female, between the ages of 90-100 years, and had a diagnosis of AD. Sessions were conducted on the dining-room table of the assisted-living

facility; nothing other than the assessment stimuli were present or in arms reach of the individual. Sometimes other individuals were at the table during the assessment.

Responses and Interobserver Agreement

Item selection was defined as the individual making single-hand contact with a stimulus or verbally pronouncing their selection. Nursing staff served as second observers who simultaneously but independently collected data during 25% of sessions. Each observer recorded the individual's selection on each trial using a pen-and-paper data sheet. Trial-based exact interobserver agreement (IOA) was calculated. *Agreement* was defined as both observers recording the same item selection for a trial. Interobserver agreement was calculated by dividing the number of trials in agreement by the total number of trials and multiplying by 100 to obtain a percentage. IOA was 100% in all sessions in which IOA data were collected.

Materials

Before we conducted preference assessments, the nursing staff were provided with a list of leisure items and activities and asked to choose items with which the individual typically engaged. The list was developed from our direct observations of the individuals and items around the assisted-living facility. We also asked the staff to add items to the list based on the staff's opinions of the individuals' preferences. Stimuli with which the individual engaged frequently and infrequently were used in the preference assessments. This was to increase the likelihood we had a hierarchy of high- and low-preferred stimuli. We selected five to eight items for our preference assessment. Because research suggested the elderly population prefers leisure over edible items (Ortega et al., 2012), we only used leisure items. See Table 1 for the stimuli used.

Procedure

Informed consent was obtained from powers of attorney for each individual. Because memory loss is a symptom of AD, daily assent was obtained from each individual prior to each session. Prior to each assessment, we explained the procedures to the individual. We explained the method of the preference assessments, how often we conducted preference assessments, and described the stimuli included. The individual was reminded she had the right to terminate participation each day we conducted sessions. On four occasions, Pat denied participation; Mary participated each session.

Prior to the initial preference assessment, forced-exposure trials were conducted. Stimuli were randomly selected one at a time and presented to the individuals. We modeled how to appropriately engage with each item and then handed it to the individual. Exposure trials lasted for either 1 min or until the individual stopped engaging with the item, whichever came first. After the initial preference assessment, a more abbreviated exposure trial was conducted. We explained each item to the individuals, and then conducted the preference assessment. The purpose of the forced-exposure trials was to ensure accuracy in individuals' selections.

Our assessments consisted of a series of standard MSWOs (DeLeon & Iwata, 1996) with an array of leisure items totaling up to five or eight items depending on the individual. To start an assessment, stimuli were placed equal distance from the individual. The individual was instructed to "choose one" and engaged with the selected item for a maximum of 5 min. While 5 min is longer than normal for a preference assessment (DeLeon & Iwata, 1996), we selected 5 min because some stimuli such as puzzles, or television, required several minutes with which to engage. Also, we used a longer duration of engagement because the individuals required more time for movement. The engagement interval was always 5 min for each item, unless the

individual stopped engaging with an item. Once an item was selected, it was removed from the array, and the individual was instructed again to "choose one" from the remaining stimuli. This procedure continued until all of the stimuli were selected or the individual stopped making selections for 3 min.

When the individual attempted to select more than one stimulus at a time, the attempt was blocked. After the attempt was blocked, the trial restarted, and the directive “choose one” was given again. If a selection was not made following 30 s, the trial was restarted, and the directive was delivered again. If the individual still did not make a selection for 3 min, the assessment was considered complete. Comments, verbal praise, and specific feedback were not delivered to the individuals based on selections; however, we delivered noncontingent attention during the assessments.

One session consisted of a single MSWO from start to finish, meaning all stimuli were selected once and ranked accordingly (or at least a subset of the stimuli was selected in cases when the individual stopped making selections). A trial was each opportunity to make a selection. For assessments with eight items (Mary), a session consisted of 8 trials (or fewer when she stopped making selections). For assessments with five items (Pat), a session consisted of 5 trials (or fewer when she stopped making selections). One session was conducted per day, five to seven days per week.

Stimuli were ranked each session based on the order of item selection. The initial preference assessment determined the item rank and categories; preference shifts were subsequently monitored. For Mary, the items selected first, second, and third were ranked as *highly preferred (HP)*. Items selected fourth, fifth, and sixth were ranked as *moderately preferred (MP)*. The remaining two stimuli were ranked as *lowly preferred (LP)*. For Pat, the

items selected first and second were ranked as *HP*. Items selected third were ranked as *MP*. The remaining two stimuli were ranked as *LP*. Each item received a rank number. For example, when stuffed animal was selected first, it received a rank number of 1. The lower the rank number, the higher the preference. Although this classification of items was arbitrary, this allowed us to determine if and when shifts in preferences occurred. All items not selected received one number higher than the lowest rank (e.g., six or nine). We evaluated a hierarchy of preference for each individual each day. We compared assessment results from one day to the next to determine stability over time. Preference stability was defined as preferences which remained consistent in rank (HP, MP, or LP) from one session to a subsequent session. A preference shift was defined as any kind of rank movement across sessions. For example, when an item moved from the HP rank to MP rank, we considered that a preference shift. We completed 20 preference assessments for each individual.

Data Analysis

Data were analyzed for each of the 20 preference assessments. We analyzed each item's rank each session to determine item preference shifts across the MSWOs. We also analyzed category averages for HP, MP, and LP items. The initial preference assessment determined which stimuli belonged to which category. We then averaged the rank of items within the category. For example, when *magazine*, *puzzle*, and *stuffed animal* were selected first, second, and third (or ranked 1, 2, and 3 respectively) during the first preference assessment, they were categorized into the HP category. To determine a category average, the item ranks 1, 2, and 3 were added up (6) and divided by the number of items in the category (3) to obtain the aggregated rank. In this example, the HP category had a rank of 2. We continued this method for each subsequent preference assessment, maintaining the same items in the calculations and

analyzed category movement. For example, if in the second MSWO, magazine, puzzle, and stuffed animal received ranks of 3, 6, and 1, respectively, that aggregate rank (of the highly preferred items) would be 3.3 (i.e., 3+6+1 which is 10 divided by 3 items). At the same time, the rank of stuffed animal would be 3 for the first session and 1 for the second. We examined individual item shifts as well as shifts in categories for each of the three categories of items.

Results

Mary's item selection was variable across sessions (see Figures 1 and 2). Figure 1 shows Mary's individual item selection for sessions 1, 5, 10, 15, and 20. For the top three items, 18 preference shifts occurred. These were times in which an item moved from one level of preference to another (e.g., went from HP to MP). Preferences did not remain stable; however, stuffed animal (Rank #3) remained in the HP category in every session. Further, when only examining preferences from Sessions 5 through 20, preferences appeared more stable. For example, stuffed animal and blanket were always ranked highly preferred during these sessions.

Figure 2 shows Mary's highest- and lowest-ranked items across all 20 preference assessments. Magazine was the highest-ranked item in Session 1 but only ranked as a highly preferred item for five additional sessions; magazine moved to the LP category one time during the 20 assessments. Book was ranked last in Session 1, but was never ranked LP again. Subsequently, book was ranked as HP in seven sessions, and was otherwise moderately preferred.

Pat had some consistency with item selection (see Figures 3 and 4). Figure 3 shows Pat's individual item selection for sessions 1, 5, 10, 15, and 20. Highly preferred items consisted of blanket and coloring, and consisted of 17 preference shifts. However, coloring was the reason for

13 of the 17 preference shifts. Otherwise, blanket (Rank #1) stayed relatively preferred. Figure 3 shows blanket was selected first for Sessions 1, 5, 15, and 20.

Figure 4 shows Pat's first- and last-ranked items across all 20 preference assessments. Blanket was ranked 1 in Session 1 and remained in the HP category for 16 of the 20 preference assessments, being selected first more than any other item. Further, blanket never shifted to the LP category. Stuffed animal, ranked last, remained in the LP category for three sessions, and was not selected for seven of sessions.

Discussion

The current study evaluated consistency with preferences among two individuals diagnosed with AD. While we did find individual differences, we generally found one individual to have more consistent preferences across 20 MSWOs and another individual's preferences to be inconsistent throughout the evaluation. With the impending rise of the geriatric population, these results are important because they give a glimpse of preference stability among individuals with AD. Families, caregivers, and nursing facilities should take into consideration these results when providing leisure activities for the AD population. This study only used stimuli from around the assisted-living facility making the results more generalizable across other facilities. The findings of this study will be reported to the assisted-living facility so they can use preferred stimuli in daily activities. However, it might be worth mentioning that preferred stimuli identified during the course of this study might not remain preferred.

This study had some limitations. One limitation was the arbitrary ranking of stimuli. A more quantifiable method of determining categories could yield more objective results. However, the ranking of stimuli used in this study enabled us to determine when preferences shifted. Another potential limitation of this study could have been satiation with the stimuli.

Repeated presentation of these stimuli each day might have yielded satiation within the preference assessments; however, that is a natural consequence of repeated presentation of any stimulus as would be the case in a treatment arrangement. The reason we chose an MSWO rather than a PSPA was to avoid as much satiation as possible. We tried to restrict access to items and activities as much as possible; however, some of these preferred activities included things like television and conversations that could not be realistically limited during individuals' daily lives. Finally, the last limitation of this study could have been the number of subjects. Since Mary and Pat had differences in their preference patterns, having more subjects in the study could yield more consistent results.

Future research could expand the results of this study by comparing selections of individuals with AD to selections of elderly individuals without a diagnosis. Elderly individuals without a diagnosis might show more stability in preference selections compared to individuals with AD, as would be expected from results of Hanley et al. (2006). Hanley et al. measured stability by calculating percent of trials of item selections; for each item, they divided the number of trials an item was selected by the total number of trials the item was presented. Each item received an associated rank number based on that analysis. Rank numbers were then analyzed for stability. Another direction for future research could be to expand the results of this study by using a different type of preference assessment. An MSWO yields a preference hierarchy starting from the most-preferred item to the least-preferred item; whereas, during a PSPA, the individual is forced to choose one item compared to another item. Thus, an MSWO might yield different results compared to a PSPA because of assessment format (paired items vs. group array).

Finally, future research could expand these results by comparing preference stability among the different stages of AD. Unfortunately, the present assisted-living facility was not able

to disclose demographic information of AD stages when it came to Pat and Mary. However, it might be interesting to examine if the different stages of AD produce different results. It could be hypothesized that the mild stage of AD produces more consistent stability of preference compared to the severe stage of AD; however, this is an empirical question.

Preference assessments are a common behavior-analytic technique to determine preferred items. Preferred items are imperative in many behavior-analytic treatments; these treatments are used to increase appropriate behavior or decrease inappropriate behavior (Feliciano et al., 2009). The present study used preference assessments to determine preference stability among individuals with AD over time. Results showed preferences remained relatively stable with one individual and were variable with another individual. This study adds to the gerontology literature by addressing a socially significant way to determine preferred activities.

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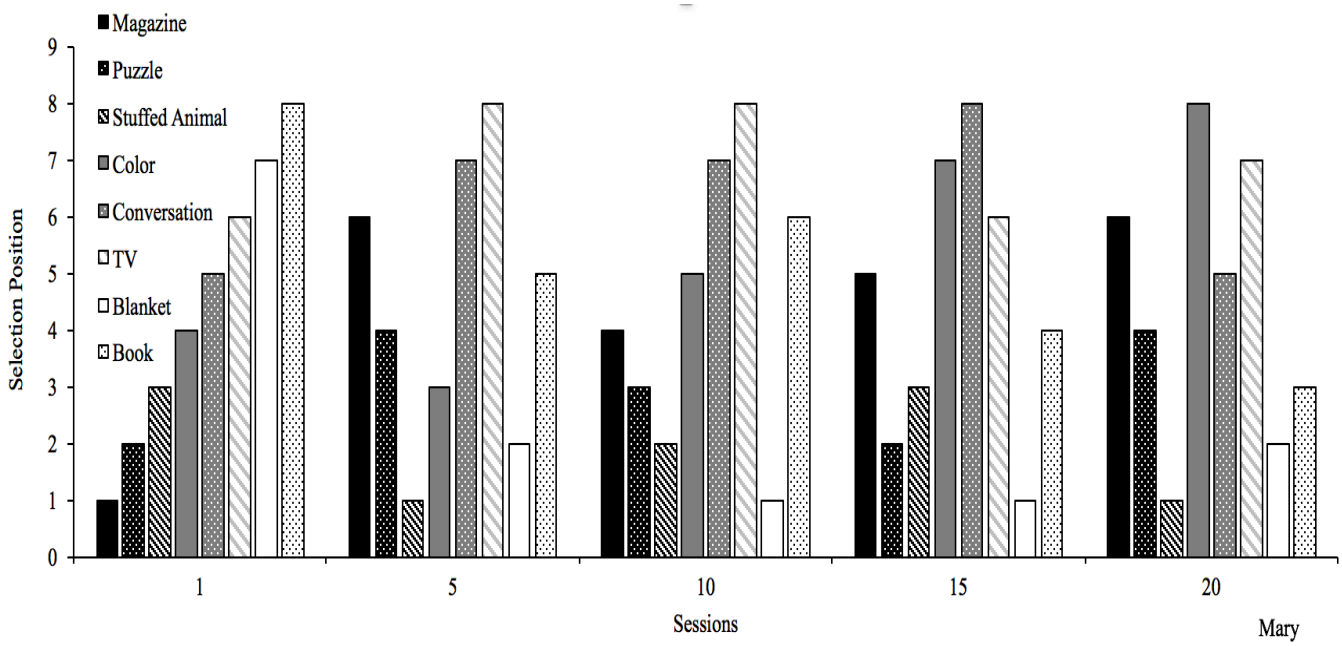

Figure 1. Figure 1 shows Mary's item ranks for all stimuli across five preference assessments (session 1, 5, 10, 15 and 20). The shorter the bar, the higher the preference. Black bars represent the HP group, grey bars represent the MP group and white bars represent the LP group.

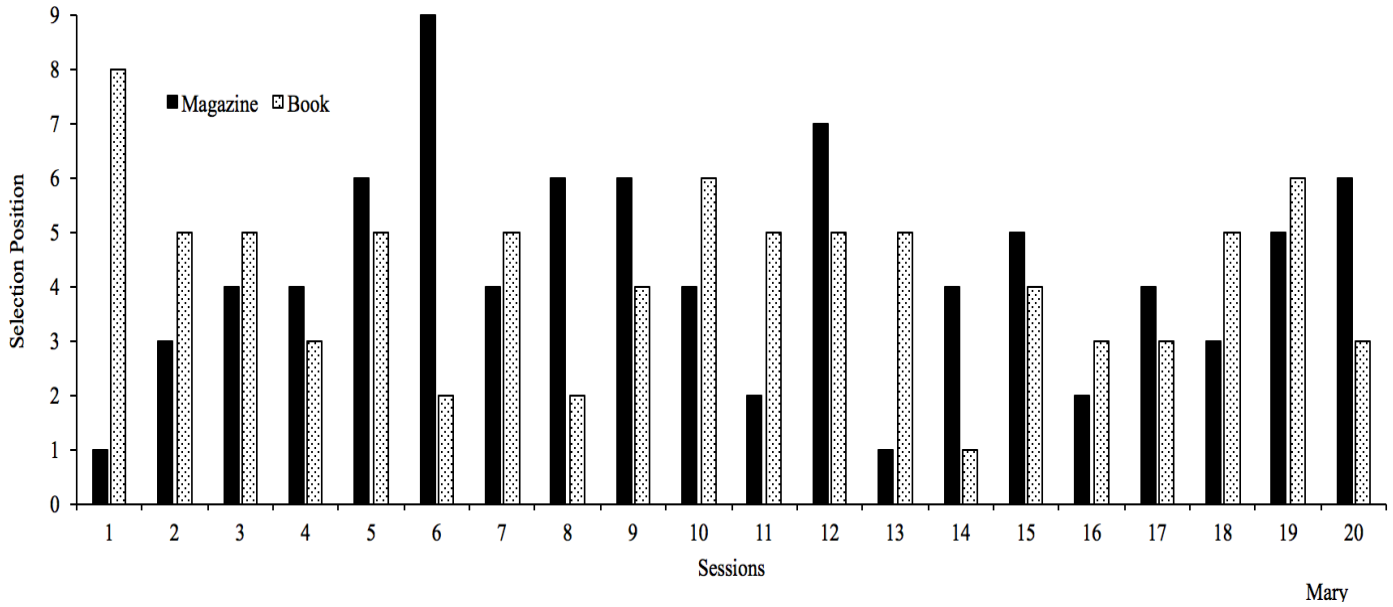

Figure 2. Figure 2 shows Mary's highest- and lowest-ranked items, magazine and book respectively, across all preference assessments. The shorter the bar, the higher the preference. Stimuli with a rank of nine were not selected.

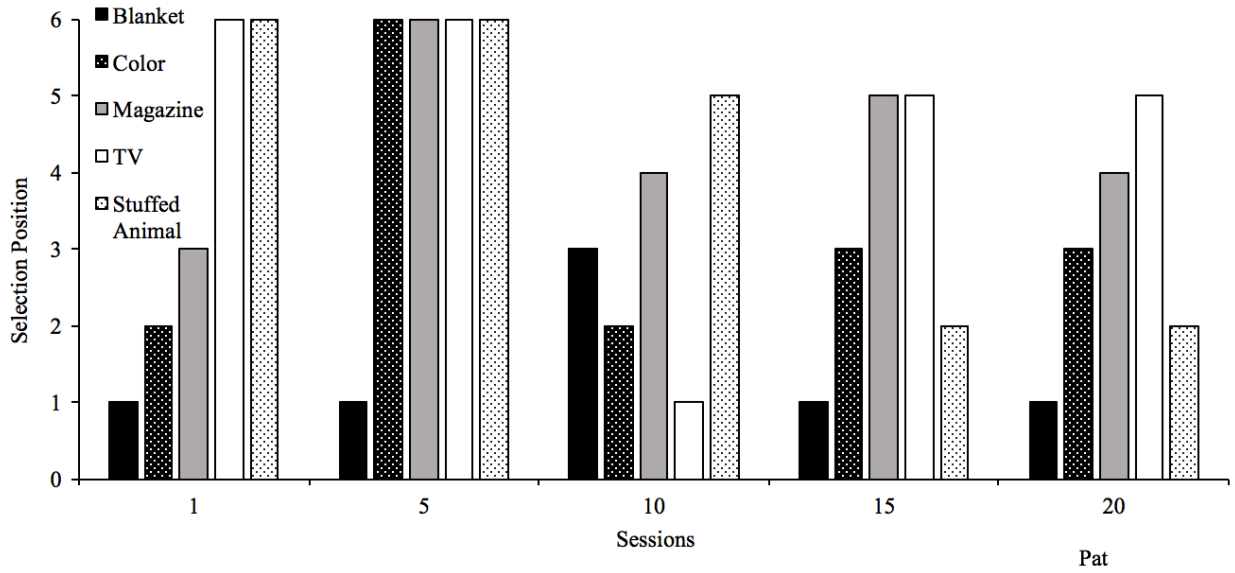

Figure 3. Figure 3 shows Pat's item ranks for all stimuli across five preference assessments (session 1, 5, 10, 15 and 20). The shorter the bar, the higher the preference. Black bars represent the HP group, grey bars represent the MP group and white bars represent the LP group.

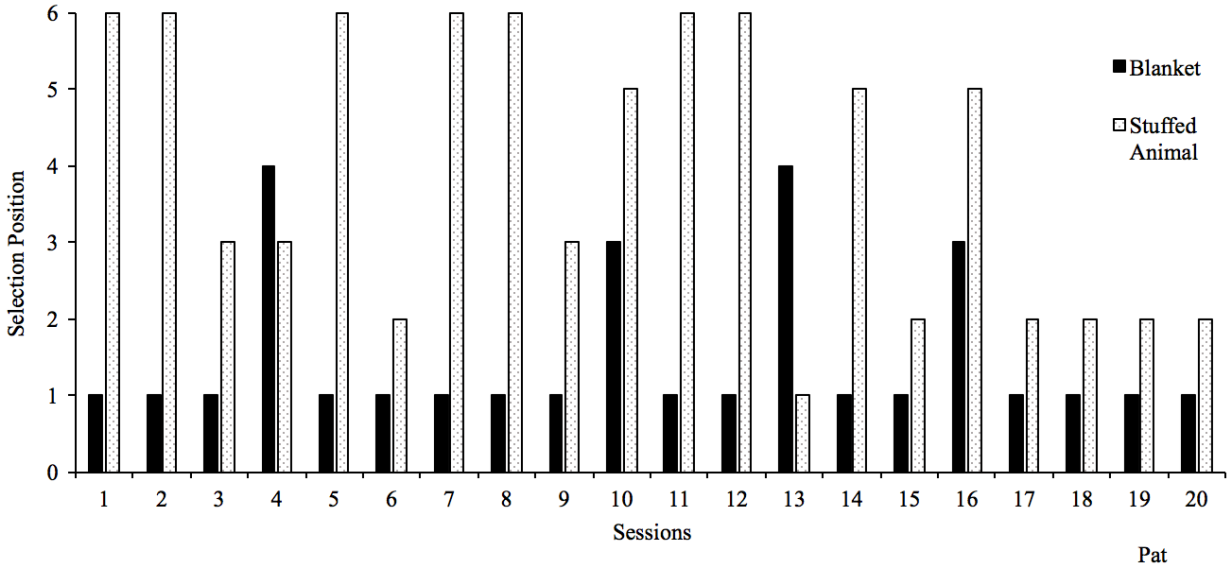

Figure 4. Figure 4 shows Pat's highest- and lowest-ranked items, blanket and stuffed animal respectively, across all preference assessments. The shorter the bar, the higher the preference. Stimuli with a rank of six were not selected.

Table 1
Preference assessment stimuli

Mary' Items	**Pat's Items**
Magazine	Magazine
Stuffed Animal	Stuffed Animal
Crayons	Crayons
TV	TV
Blanket	Blanket
Book	
Puzzle	
Conversation	

Table 1. Table 1 shows the different stimuli utilized between Mary and Pat over the course of the 20 sessions.