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BEHAVIOR-ANALYTIC RESEARCH ON DEMENTIA IN OLDER ADULTS

MARANDA A. TRAHAN

JOHNS HOPKINS UNIVERSITY SCHOOL OF MEDICINE

SUNGWOO KAHNG

KENNEDY KRIEGER INSTITUTE AND
JOHNS HOPKINS UNIVERSITY SCHOOL OF MEDICINE

AND

ALYSSA B. FISHER AND NICOLE L. HAUSMAN

KENNEDY KRIEGER INSTITUTE

It is estimated that 1 in 10 adults aged 65 years and older have been diagnosed with dementia, which is associated with numerous behavioral excesses and deficits. Despite the publication of a special section of the *Journal of Applied Behavior Analysis* (*JABA*) on behavioral gerontology (Iwata, 1986), there continues to be a paucity of behavior-analytic research with this population. This review compares the research published before and after the behavioral gerontology special section and evaluates the most recently published aging articles in *JABA*.

Key words: behavioral gerontology, dementia, Alzheimer's disease, aging

Approximately 39 million adults aged 65 years and older live in the United States (13% of the population), and these numbers are likely to increase to approximately 88.5 million (20% of the population) by 2050 (U.S. Census Bureau, 2010). Of these individuals, approximately 1 in 10 has a diagnosis of dementia (Hendrie, 1998). Dementia is the progressive deterioration of an individual's cognitive skills due to damage (e.g., stroke) or disease (e.g., Alzheimer's) that affects an individual's social or occupational functioning (American Psychiatric Association, 2000). Symptoms of dementia include impaired memory, difficulties in expressive and receptive language, and mood changes.

Currently, there is no cure for dementia, and treatments for dementia symptoms have been largely guided by the medical model, which emphasizes pharmacological interventions (Taft, Fazio, Seman, & Stansell, 1997). This model, however, has come under greater scrutiny because of the potential side effects of medications, such as confusion, delirium, and an increased risk of morbidity and mortality (Hajjar, Cafiero, & Hanlon, 2007; Tune, 2001). An alternative to the medical model is one based on the application of behavior-analytic principles. Behavioral research has demonstrated that environmental factors influence the frequency and intensity of dementia symptoms (Baltes, Burgess, & Stewart, 1980). A behavior-analytic approach focuses on the identification of contingencies that aid in individualized care planning and that decrease excess behaviors in older adults with dementia. Unfortunately, this approach has garnered relatively little interest within the behavior-analytic community (Buchanan, Husfeldt, Berg, & Houlihan, 2008; Houlihan & Buchanan, 2011).

Behavioral deficits and excesses associated with dementia include increases in aggression and disruptive vocalizations, as well as deficits in communication and discrimination skills,

Correspondence concerning this article should be addressed to SungWoo Kahng, Kennedy Krieger Institute, 707 N. Broadway, Baltimore, Maryland 21205 (e-mail: Kahng@kennedykrieger.org).

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which are behaviors that are also common to other populations (e.g., children, individuals with developmental disabilities). An abundance of behavioral research has been conducted on the assessment and treatment of behavioral excesses and deficits with these other populations. Despite the similarities in behavior across these populations, a limited number of studies have examined the use of these behavioral technologies (e.g., functional analyses, preference assessments, function-based treatments) with older adults diagnosed with dementia.

To foster new behavior-analytic research questions and methodologies with an aging population, *JABA* published a behavioral gerontology special section (Iwata, 1986). Behavioral gerontology was described as "the study of how antecedent and consequent environmental events interact with the aging organism to produce behavior" (Burgio & Burgio, 1986, p. 321). However, other than that special section, an average of less than one article per year on aging topics has been published in *JABA* (Buchanan et al., 2008). The purposes of this review are (a) to compare the number of aging-related studies published before and after the *JABA* behavioral gerontology special section, (b) to summarize the most recently published articles on aging, and (c) to suggest areas of future research with older adults.

From 1968 to 2010, *JABA* published more than 2,000 empirical articles, with only 34 addressing aging-related issues. Nine articles on aging were published prior to the behavioral gerontology special section (Iwata, 1986), and only two of those articles specifically included adults with dementia. Common dependent variables included incontinence, meal participation, engagement, and social interactions. Common interventions included delivering prompts and praise statements as well as modifying the physical environment (e.g., rearranging the furniture).

Since the behavioral gerontology special section in 1986, *JABA* has published 21 aging articles, with 15 articles including at least one participant with dementia. Nursing homes were the most common experimental settings, but several studies were conducted in adult day-care facilities, assisted living facilities, and home residences. Research on problem behavior also expanded to include wandering, aggression, and disruptive vocalizations. In addition, experimenters began to assess problem behavior using functional analyses and to implement function-based treatments. Like articles published prior to the behavioral gerontology special section, the most common intervention was the delivery of prompts, implemented alone or in combination with other interventions.

In the last 5 years, *JABA* has published more than 300 empirical articles, with only five articles specifically addressing aging issues. Four of the five articles were conducted with individuals with dementia, and all five of the articles were conducted in nursing homes. Two of the articles examined the assessment and treatment of problem behavior using functional analyses and individualized function-based treatments in individuals with dementia (Baker, Hanley, & Mathews, 2006; Dwyer-Moore & Dixon, 2007). The three other articles evaluated the use of activities, prompts, and praise statements to increase engagement and improve mood in individuals with and without dementia (Brenske, Rudrud, Schulze, & Rapp, 2008; Dixon, Nastally, & Waterman, 2010; Moore, Delaney, & Dixon, 2007).

Baker et al. (2006) trained a certified nursing assistant (CNA) to assess the functions of aggression and to implement an intervention for a 96-year-old woman with dementia. Prior to the functional analysis, the experimenters conducted a setting analysis to determine if aggression was occasioned in a specific location (i.e., the bathroom) or by staff proximity during a recreational routine. Following the setting analysis, which showed that aggression occurred almost exclusively during the bathroom routine, the CNA conducted a functional analysis to

evaluate the factors that maintained aggression. The analysis revealed that aggression was most likely maintained by escape. Based on these data, the CNA was taught to implement noncontingent escape by prompting the participant through 20 s of the bathroom routine followed by a 10-s break. This treatment decreased aggression to near-zero levels.

Dwyer-Moore and Dixon (2007) conducted a functional analysis of wandering and disruptive vocalizations with three individuals with dementia. They subsequently evaluated a function-based treatment with each participant. Treatment for the first participant, whose disruptive vocalizations were maintained by attention, consisted of differential reinforcement of an alternative behavior (DRA; 3 to 5 s of attention contingent on appropriate vocalizations) and extinction. Disruptive vocalizations were maintained by escape for the second participant, and treatment consisted of DRA (appropriate communication for a break) plus extinction. Finally, the experimenters provided noncontingent attention and five highly preferred items to the third participant, whose wandering was maintained by attention. Results showed that problem behavior for all participants decreased only when the function-based treatments were in effect.

Three of the five aging-related articles published within the last 5 years of *JABA* addressed quality-of-life issues, including methods to increase activity engagement and mood. Common symptoms of dementia include low levels of activity engagement and mood changes (Aalten, de Vugt, Jaspers, Jolles, & Verhey, 2005; Kuhn, Fulton, & Edelman, 2004), which could be the result of (a) lack of access to meaningful or preferred activities (Teri & Logsdon, 1991) or (b) weakened stimulus control of previously known items, activities, and people (Skinner, 1983). Activities that once occasioned behavior may no longer evoke that behavior, even though the items, activities, or people were discriminative stimuli in the past, and reinforcement is still available. The following three studies addressed the problems of meaningful activities and stimulus control to increase engagement and mood in older adults.

Brenske et al. (2008) assessed the effects of descriptive prompts on activity attendance and engagement in six individuals diagnosed with dementia. After participants completed a preference assessment, experimenters delivered general prompts to attend activities in the activity room (e.g., ''There are activities in the room by the elevators.''). If a participant entered the room, an experimenter described the available activities. During the intervention phase, if the participant did not indicate that he or she would enter the activity room after the general prompt was delivered, the experimenters delivered a descriptive prompt (e.g., ''There will be crossword puzzles.''). Once inside the activity room, experimenters provided model and verbal prompts when a participant did not manipulate an activity. Results showed that the descriptive prompts increased the participants' attendance to the activity room and engagement in activities. The authors suggested that the descriptive prompts might have functioned as an establishing operation that evoked walking to the activity room by increasing the value of the conditioned reinforcer.

Both Moore et al. (2007) and Dixon et al. (2010) evaluated the effects of exposure to infrequently available activities on happiness levels in six older adults with and without dementia. All participants with dementia were systematically exposed to (a) two activities chosen by the experimenter and (b) one activity identified by the caregiver as preferred. All participants without dementia played simulated gambling games (e.g., slot machines, blackjack). Results of both studies showed that during the 5 to 20 min of access to activities, all participants had a marked increase in happiness, as indicated by the participant's facial expressions (e.g., smiling or laughing).

Although the five reviewed studies have extended the field of behavioral gerontology

by providing information on strategies to decrease problem behavior and increase quality of life in older adults, future research is still greatly needed. For example, none of the aforementioned studies assessed generalization or maintenance of behavior change, and a staff member was trained to implement the intervention in only one study. Generalization, maintenance, and caregiver training are equally as important as modifying the behavior during the experimental sessions. Several methods described by Stokes and Baer (1977) to promote generalization, including programming common stimuli and training sufficient exemplars, have not been experimentally validated with an aging population. This is particularly important given that individuals with dementia demonstrate a deterioration in skills over time.

A second limitation of the reviewed research is the restricted nature of the problems addressed. The most recent aging research in *JABA* has addressed only issues related to behavior problems, engagement, and mood. Although these issues should continue to be evaluated, behavior analysts should broaden their research with this population. For example, word-finding difficulty, forgetting names, and difficulty performing simple tasks are three very common dementia symptoms for which behavioral gerontologists can intervene. Research on verbal behavior, derived relational responding, delayed discounting, and schedules of reinforcement, to name a few, have barely scratched the surface on description, assessment, and treatment with older adults.

A final limitation of the recent research on geriatric issues is the failure to include participants outside a long-term care facility. Less than 5% of older adults live in nursing homes (Hetzel & Smith, 2001), but all of the most recent articles and half of all articles published after the 1986 special section were conducted there. More research needs to be conducted in the homes of the aging individual because the majority of older adults live in the community. Given the vast research opportunities in the field and its implications for society as a whole, behavior analysts should continue to study and publish research on geriatric issues.

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