Research Papers   Graduate School

Fall 10-17-2013

A Review of Empirical Approaches to Maintenance of Staff Implementation of Function-Based Interventions in Nursing Home Settings

Kazu Takeguchi
SIUC, kazutakeguchi@siu.edu

Follow this and additional works at: http://opensiuc.lib.siu.edu/gs_rp

A REVIEW OF EMPIRICAL APPROACHES TO MAINTENANCE OF STAFF

IMPLEMENTATION OF FUNCTION-BASED INTERVENTIONS IN NURSING HOME

SETTINGS

by

Kazu Takeguchi

B.A., University of Nevada, Reno, 2008

A Research Paper

Submitted in Partial Fulfillment of the Requirements for the

Master of Science

Department of Behavior Analysis and Therapy

in the Graduate School

Southern Illinois University Carbondale

December 2013

RESEARCH PAPER APPROVAL

A REVIEW OF EMPIRICAL APPROACHES TO MAINTENANCE OF STAFF
IMPLEMENTATION OF FUNCITON-BASED INTERVENTIONS IN NURSING HOME
SETTINGS

by

Kazu Takeguchi

A Research Paper Submitted in Partial

Fulfillment of the Requirements

for the Degree of

Master of Science

in the field of Behavior Analysis and Therapy

Approved by:

Jonathan C. Baker

Graduate School
Southern Illinois University Carbondale
December 2013

AN ABSTRACT OF THE RESEARCH PAPER OF

KAZU TAKEGUCHI, for the Master of Science degree in Behavior Analysis and Therapy at Southern Illinois University Carbondale

TITLE: A REVIEW OF EMPIRICAL APPROACHES TO MAINTENANCE OF STAFF IMPLEMENTATION OF FUNCTION-BASED INTERVENTIONS IN NURSING HOME SETTINGS

MAJOR PROFESSOR: Dr. Jonathan C Baker

The use of atypical anti-psychotic medications has been increasing in nursing homes, even though the adverse effects of such medications in patients with dementia have been widely reported. Additionally, the Omnibus Budget Reconciliation Act of 1987 mandates the use of behavioral interventions before any medications are used in order to reduce challenging behaviors in demented patients. It has been empirically demonstrated that function-based behavioral interventions are effective in reducing challenging behaviors in older adults with dementia. Behavioral interventions are safe, noninvasive, and usually positive alternatives for physical or medical restraints. However, local staff's intervention implementation is typically not maintained after staff trainings: behavioral intervention programs usually do not survive after behavior analysts leave the setting. Miller (2004) suggests strategies to promote program survival. This paper will summarize these suggestions, review the literature since Miller, and will discuss implications for future research on the ways to evaluate the effectiveness of the strategies.

Keywords: sustainability of behavior intervention, program survival, function-based behavior intervention, dementia.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

In 2011, the baby boomers began turning 65, and the elderly population, those aged 65 years or older, is predicted to increase dramatically in the next 20 years (Older Americans, 2012). The number of older adults is projected to double from roughly 35 million today to more than 70 million by 2030 (Older Americans). Currently, individuals over the age of 65 comprise about 14% of the total population in the United States while those over 85 comprises about 6%; by 2030, approximately 20% of the population is expected to be older adults (Older Americans). Likewise, the prevalence of dementia has also been increasing. As of 2010, approximately 13% of individuals age 65 and older (i.e., 5.2 million people) have Alzheimer's disease and other dementias, and the figure is expected to increase by 50% (i.e., 7.7 million) (Alzheimer's Disease Facts and Figures, 2010). An estimated 2.4 million people aged 85 and older currently have Alzheimer's, and it is expected to increase to 3.5 million when the first wave of baby boomers reaches age 85 years in 2031 (Alzheimer's Disease Facts and Figures).

While majority of older adults reside in the community, approximately 4% of those age 65 and over, and 15% of those age 85 and over reside in long-term care facilities (Older Americans, 2012). Although there are a variety of options of long-term care facilites such as nursing homes, foster homes, retirement homes, life care communities, and hospice, nursing homes have been the most common among all (Burgio & Bourgeois, 1992). Several surveys have found that the majority of nursing home residents have mental disorder diagnoses, and the most prevalent is dementia (Burgio & Bourgeois). In Kamble et al.'s (2009) study, the systematic analysis of a sample of residents from the 2004 National Nursing Home Survey (NNHS), which is nationally representative, revealed that 53% of residents had dementia in nursing home settings.

A large portion of nursing home residents engage in challenging behaviors such as physical aggression, repetitive and/or disruptive vocalizations, and wandering (Burgio & Bourgeois, 1992; Dwyer-Moore & Dixon, 2007). Especially among individuals with dementia, challenging behaviors are overwhelmingly common, in addition to clinical problems such as depression, paranoia, anxiety, sexual dysfunction, and sleep disorders (Teri et al., 1992). Early literature on Alzheimer's disease even specifies that behavior problems are one of the core issues in diagnosis and management of such individuals (Teri et al.). A number of research studies have demonstrated the compelling relationship between dementia and challenging behavior (Burgio & Bourgeois). For example, the level of dementia severity and challenging behaviors are strongly correlated, and several studies have shown that challenging behaviors become more prevalent as dementia becomes more severe (Burgio & Bourgeois). Prevalence and diversity of challenging behavior in nursing home settings have been reported in numerous clinical reports, and surveys indicate that up to 80% of nursing home residents with dementia display moderate to severe challenging behaviors (Stevens et al., 1998).

The orientation of care for institutionalized populations (e.g., individuals with developmental disabilities and older adults with dementia) has "progressed from a predominantly custodial model to that of therapy and rehabilitation," and providing psychosocial care treatment, in addition to basic care, has been greatly emphasized (Burgio & Burgio, 1990). In dementia care, the management of challenging behaviors has a large priority (Burgio & Burgio; Street et al., 2000).

Challenging behaviors impair older adults' functioning, create distress in their caregivers, and increase the risk of institutionalization. The difficulties of managing problem behaviors have a tremendous impact on the well-being of caregivers and consequently on the quality of life of care

recipients. In long-term care settings, as the results of surveys conducted by Cassidy et al. (2001) indicate, nursing aides feel ill-prepared and have difficulties in managing challenging behaviors. Almost all of them are constantly exposed to residents' repetitive demands, complaints, and disruptive behaviors, which make their work environment highly uncomfortable (Burgio & Bourgeois, 1992). Moreover, they are often the targets of the residents' outburst such as verbal aggression and physical aggression (Burgio & Bourgeois).

The frequent occurrences of challenging behaviors and difficulties in managing such behaviors make staff feel discouraged and stressed, and directly influence the levels of burnout and frustration (Cassidy et al., 2001). It may impact the staff morale and lower the quality of care they provide to residents, and may lead to extremely high turnover rates in typical nursing homes (Burgio & Burgio, 1990; Cassidy et al.). The turnover rates were estimated to be around 70% in the sample used in Burgio and Burgio's (1990) study. The high turnover rates could lead to a waste of resources that results from conducting staff training every time staff resigns and new staff is hired and which could be better spent to improve the quality of care.

In an attempt to reduce antipsychotic in nursing homes, the Health Care Finance Administration (HCFA) created regulations to mandate behavioral interventions in the Omnibus Budget Reconciliation Act of 1987 (OBRA-87); however, pharmacotherapy has widely been used in order to reduce challenging behaviors in individuals with dementia in nursing homes (Burgio & Burgio, 1990). According to Kamble et al. (2009), the use of atypical antipsychotic agents has been increasing, even though recent data indicate that the risk of its adverse effects may offset its benefits in patients with dementia. Their systematic review of prescriptions and residential files from the 2004 National Nursing Home Survey (NNHS) revealed that 33% of nursing home

residents with dementia were on pharmachotherapy and were given antipsychotic medications (Kamble et al., 2009).

OBRA (1987) requires the use of behavioral interventions prior to the use of any forms of restraint including antipsychotic medications (Baker, Hanley, & Mathews, 2006). It firstly prohibits the use of drugs which are "given in excessive doses, for excessive periods of time, without adequate monitoring, or in the absence of a diagnosis or reason for the drug" (483.25). It mandates not only data collection on the efficacy of the pharmacotherapy but also specific psychotic conditions (e.g., schizophrenia, delusional disorders) that are responsive to the mediation in order to justify the use of the antipsychotic medication (Burgio & Bourgeois, 1992). As for treatment for individuals with dementia, antipsychotic medications can be used only if both of psychotic symptoms and challenging behaviors which place self and others at a risk of injury are displayed (Burgio & Bourgeois). In addition, it mandates any possible efforts to discontinue medication; it mandates that drug dose be gradually reduced and behavioral interventions be implemented, unless their use is clinically inadvisable (Burgio & Bourgeois).

CHAPTER 2

FUNCTIONAL ANALYSIS AND FUNCTION-BASED INTERVENTION

Behavioral interventions have been widely studied for decades and successfully used to treat and manage challenging behaviors in various clinical populations and settings, including older adults in nursing homes. In the history of development of behavioral interventions, the ways behavior analysts conduct assessments and design treatment plans have dramatically changed since Iwata et al. (1982/1994) introduced a comprehensive functional analysis method to the field of applied behavior analysis (Carr, Coriaty, & Dozier, 2000; Hanley, Iwata, & McCord, 2003). Before then, behavior analysts commonly selected an intervention strategy according to a target behavior's topography (Carr et al.). Typically, they arbitrarily selected reinforcement or punishment contingencies that were considered to be more powerful than the existing contingency that maintained the target behavior, without systematically investigating the existing contingency (Hanley et al.). The effectiveness of such interventions, however, is not always guaranteed if the function of the target behavior is unknown (Carr et al.). Despite their philosophy and attempts to implement as least restrictive interventions as possible, designing a topography-based intervention strategy involving an arbitrarily selected contingency, which could be ineffective, would lead to the implementation of more intrusive procedures such as punishment-based interventions (Carr et al.).

Since Iwata et al. (1982/1994) proposed the functional analysis method, behavior analysts have selected intervention strategies based on the function of a target behavior rather than its topography (Carr et al., 2000). The shift in intervention prescription method (i.e., from arbitrary, topography-based prescription to more precise, function-based prescription) has resulted in the reduction of punishment-based interventions, as well as in the development of functional

assessments and reinforcement-based interventions (Carr et al.; Hanley et al., 2003). In order to develop a function-based intervention, a functional assessment is firstly conducted, and then an appropriate intervention strategy is selected based on the results of the pretreatment assessments.

Functional analysis is conducted to identify environmental variables that are responsible for the occurrence of problem behavior through direct observation, repeated measurement of the behavior, and manipulation of environmental variables (Hanley et al., 2003). There are two models of functional analysis; while antecedent events are manipulated in one model, both antecedent and consequent events are manipulated in the other model (Hanley et al.). In both models, the variables that control challenging behavior are identified by comparing the level of the occurrence of target behavior under test and control conditions; variables hypothesized to be relevant are present in test conditions, while they are absent in control conditions (Hanley et al.). In each model test conditions, relevant motivating operations, discriminative stimulus, and source of reinforcement for a hypothesized contingency are present (Hanley et al.); for example, in a tangible condition, deprivation of food, a caregiver wearing a pink shirt, and food are present. On the other hand, the same operations, stimulus, and contingency are removed in the control condition (Hanley et al.). The most commonly hypothesized and tested variables are social-positive reinforcement (i.e., attention, tangible items such as foods and toys), social-negative reinforcement (i.e., escape or avoidance), positive automatic reinforcement (i.e., sensations obtained from a behavior, visual stimulation obtained from eye poking, for example), and negative automatic reinforcement (i.e., termination of aversive sensations such as headache) (Hanley et al.). Once controlling variables and contingencies that maintain the challenging behavior are identified, intervention strategies can be selected and designed effectively because the functional analysis provided the important information regarding which antecedent stimuli (i.e., discriminative stimuli and establishing

operations) and consequent stimuli should be altered to reduce the challenging behavior (Hanley et al.).

Although there have been a wide variation in the procedures of function-based treatments in published research studies, the most common intervention strategies in the currently available literature are extinction, noncontingent reinforcement, functional communication training, and curricular revision (Carr et al., 2000). In extinction, as an intervention strategy, the reinforcer that maintains a challenging behavior is withheld contingent upon its occurrence so that a contingency of reinforcement maintaining the challenging behavior is systematically interrupted and consequently eliminated (Carr et al.).

In extinction procedures to reduce attention-maintained behaviors, attention is withheld contingently upon the occurrence of the behavior so that the behavior no longer results in and is reinforced by attention. In extinction procedures to reduce behaviors maintained by escape from instructional demands, escape is not provided when the behavior occurs so that the behavior no longer results in and is reinforced by the termination of aversive demands. In extinction procedures to reduce behaviors maintained by automatic reinforcement, sensory stimulation produced as a consequence of a challenging behavior is eliminated or reduced, using protective equipment such as helmets and gloves (Carr et al., 2000). Carr et al. (2000) points out that the effectiveness of extinction programs depends upon their treatment integrity; challenging behaviors are reinforced intermittently and are not reduced if the extinction programs are not implemented accurately across a consumer's environment. Additionally, Carr et al. insist that extinction should be used alongside with some sorts of interventions to teach functional skills, especially if the challenging behavior is the only way for the consumer to get access to reinforcers. Since extinction procedures

eliminate the target behavior from the consumer's repertoire, they should be taught a new appropriate skill to access reinforcers (Carr et al.).

Noncontingent reinforcement procedure involves the time-based, instead of response-based, delivery of reinforcing stimuli that maintain a challenging behavior (Carr et al., 2000). Reinforcing stimuli can be delivered on fixed-time, variable-time, random-time, and continuous-delivery schedules (Carr et al.). The schedule of reinforcement is dense first and thinned gradually once the reduction in challenging behavior is consistently observed (Carr et al.).

It has been demonstrated that noncontingent reinforcement procedures reduce challenging behaviors more or at least as much as other decelerative intervention programs (e.g., differential reinforcement of other behavior, differential reinforcement of alternative behavior, and extinction; Carr et al., 2000). Also, reinforcement is usually delivered more frequently in noncontingent reinforcement procedures than in other decelerative programs (Carr et al.). Another benefit of noncontingent reinforcement procedures is it is generally easier to implement, especially the ones involving fixed-time schedule, compared to the other interventions (Carr et al.). Moreover, it has been demonstrated that noncontingent reinforcement result in less extinction-induced behavior such as aggression and response bursts than other interventions (Carr et al.). In addition to all the benefits described above, noncontingent reinforcer has been successfully used with various behavioral topographies (e.g., aggression, disruption, inappropriate speech, pica, rumination, SIB, and stereotypy) and functions (e.g., attention, access to materials, escape of instructional demands, and automatic reinforcement) (Carr et al.). On the other hand, limitations of noncontingent reinforcement procedure are that it does not teach new skills to consumers, and that challenging behaviors can be reinforced accidentally (Carr et al.).

CHAPTER 3

BEHAVIOR ANALYTIC STUDIES WITH OLDER ADULTS

The majority of research studies in the field of behavior analysis have involved individuals with developmental disabilities (Carr et al., 2000). Although most of the studies on functional assessments and function-based interventions have been conducted with the population diagnosed with developmental disabilities as well, several studies have been conducted with older adults with dementia.

Heard and Watson (1999) successfully reduced wandering in four older adults with dementia residing in nursing homes, using differential reinforcement of other behavior (DRO). They conducted direct behavioral observations to identify the consequences of wandering and determine the functions of the behavior (Heard & Watson, 1999). The results indicated that two of the four participants' wandering was maintained by social attention while the other two were maintained by access to tangibles and sensory stimulation respectively (Heard & Watson). Interventions were developed for each participants based on the results of functional assessments, using differential reinforcement of other behavior where relevant reinforcers were provided contingently upon the absence of the challenging behavior and withheld contingently upon the occurrence of the behavior (Heard & Watson).

Buchanan and Fisher (2002) reduced disruptive vocalizations in two nursing home residents using noncontingent reinforcement procedure. Pretreatment functional assessments indicated that one of the participants' behaviors was maintained by attention while the other was maintained primarily by attention and also by sensory stimulation (Buchanan & Fisher, 2002). In their noncontingent reinforcement procedure, they provided participants with attention, and attention and sensory stimulation, on fixed timed schedules.

Baker, Hanley, and Mathews (2006) trained local staff to administer a functional analysis and implement an intervention based on the results of the functional analysis. A nursing home resident's aggressive behavior was maintained by escape from demands, and an intervention was designed using a noncontingent reinforcement procedure; escape from demands was provided on fixed time schedule. The staff-administered intervention effectively reduced the occurrence of aggressive behavior.

Dwyer-Moore and Dixon (2007) conducted functional analyses prior to intervention development and found out their participants' challenging behaviors, vocalization and wandering, were maintained by attention and escape from demands. For one participant whose vocalization was maintained by attention, differential reinforcement of appropriate behavior (DRA) was selected as an intervention; the experimenter provided preferred social attention contingently upon the occurrence of appropriate vocalization (Dwyer-Moore & Dixon, 2007). For the second participant whose wandering was maintained by attention, noncontingent reinforcement (NCR) was selected as an intervention; the experimenter provided social attention on a fixed time schedule and preferred leisure item continuously if he stayed in a designated area (Dwyer-Moore & Dixon). For the third participant whose vocalization was maintained by escape from demands, functional communication training and extinction were selected as intervention; the experimenter provided a brief break contingently upon prompted and independent correct functional communication responses such as handing "break" card (Dwyer-Moore & Dixon).

CHAPTER 4

STAFF TRAINING AND STAFF MANAGEMENT

Caregiver training has been one of the major areas of study in the field of behavioral gerontology. The definition of behavior analysis is the natural science devoted to describing and predicting behavioral changes by identifying biological and especially environmental variables and to controlling behavior by manipulating environmental factors (Association for Behavior Analysis International); therefore, the majority of interventions derived from the principles of applied behavior analysis involve changing and controlling environment. Whether older adults reside in long-term care settings or in community settings, caregivers (i.e., nursing aides in the long-term care settings and family caregivers in the community) comprise a major part of the care recipients' environment. Nursing aides provide 90% of patient care in nursing homes (Burgio & Burgio, 1990).

As Lundervold and Lewin (1992) described, caregivers' behaviors are often significant antecedents and/or consequences of care recipients' behaviors. For example, if a nursing home resident engages in hitting which is maintained by escape from aversive stimuli associated with toileting, nursing aides' behavior of saying "It's time to go to the bathroom" might function as an antecedent. If a community-dwelling older adult engages in house-keeping tasks which are maintained by attention, family caregivers saying "Thank you for your help" might function as a consequence of the behavior. In addition, caregivers directly control and influence significant antecedents and consequences of care recipients' behaviors (Ludervold & Lewin, 1992). For example, the amount of time the nursing aides spend to complete the toileting routine in the earlier example might influence the care recipient's skin temperature, which is also an antecedent of hitting. The family caregivers might control the excitement level or volume of "Thank you for

your help," which is a consequence of the care recipient's behavior and determines the future frequency of the behavior. It is inevitable to change the behavior of nursing aides and family caregivers in changing the behavior of older adults (Ludervold & Lewin), and therefore, manipulating the behavior of caregivers through caregiver training and management play a critical role in behavioral interventions for older adults with or without dementia.

Likewise, behavior problems (i.e., behavior excess and deficits), the issues commonly studied in behavioral gerontology literatures, can be conceptualized behaviorally as follows. Although irreversible, degenerative, disease processes play an important role in older adults' behavior problems in many cases, in many other cases, their behavior problems are under the control of the environmental conditions including the behavior of caregiver and therefore can be prevented and reversed (Burgio & Burgio, 1990).

As described earlier, challenging behaviors are common in institutional settings. Behavioral excess or challenging behaviors, including agitation, verbal and physical aggression, disruptive vocalization, wandering, and resistance to hands-on caregiving tasks (Buchanan et al., 2008), is not only influenced by physical conditions but, to a large extent, influenced by the environment where caregivers can inappropriately reinforce challenging behaviors (Burgio & Burgio1990). The purpose of behavioral interventions is usually to increase adaptive behaviors (e.g., social interaction, ambulation, feeding) and to decrease challenging behaviors (e.g., aggression, disruptive vocalization, wandering); as well as in promoting functional skills, the results of the success in decreasing challenging behaviors is largely dependent upon the quality of training for caregivers (Burgio & Burgio).

According to Burgio and Burgio (1990) and Hawkins, Burgio, Langford, and Engel (1992), research on staff training and management has been scarce in long-term care institutions

for older adults because unlike health-care facilities for other dependent population such as the developmentally disabled and emotionally disturbed, the shift from custodial model to therapeutic model of rehabilitation is relatively new in the geriatric field; the basic care rather than rehabilitative care and training tend to be the core of services in nursing homes. Staff training and management procedures used in research studies on the aged population are adopted largely from those on the developmentally disabled (Bugio & Burgio, 1990; Hawkins, Burgio, Langford, & Engel, 1992). Although modifications are necessary, the methods demonstrated to be effective in such settings are applicable in geriatric settings because there are many similarities among the settings and direct care staff between the institutions for individuals with developmental disabilities and those for older adults (Burgio & Burgio; Hawkins et al.).

CHAPTER 5

PROGRAM SURVIVAL AND ADOPTION

As discussed earlier, staff's responses to implement behavior intervention programs tend to be not maintained if there is no effective staff management program in place after staff training. Even though a number of research studies have demonstrated the effectiveness of behavioral interventions that are safe, noninvasive, and usually positive alternative for physical or medical restraints, such behavioral interventions have not always been adopted in clinical settings (Couch et al., 1986; Baker & LeBlanc, 2011). Behavior intervention programs do not typically survive after behavior analysts terminate their research and leave the setting; local staff tend to not keep implementing such programs and not implement them reliably and correctly (Miller, 2004).

Miller (2004) defines program survival as "the continued use of a behavioral program by its natural implementers under the direct control or the indirect control of the outcomes generated by that program" (p. 4). Miller also identifies several factors that influence the survival of intervention programs in natural settings and suggests strategies to promote program survival. According to Miller, important factors that impact local staff's response maintenance of intervention implementation are: the involvement of administrators and supervisors in the settings, the quality of staff management program, response effort for local staff to implement treatment programs, natural reinforcers generated by the treatment programs, the involvement of consumers or guardians, and environmental events (i.e., motivating operations, antecedent events, reinforcing consequent events) programmed in the interventions.

Miller (2004) proposes that, in order to promote the maintenance of local staff's correct and reliable intervention implementation, behavior analysts should get administrators and supervisors involved and ensure that they reinforce their staff's intervention implementation. The

effectiveness of the administrators or supervisors' involvement and reinforcer delivery was demonstrated in a few studies (Johnson, Welsh, Miller, & Altus, 1991; Welsh, Miller, & Altus, 1994).

In Welsh, Miller, and Altus' (1994) study, resident staff's effective meeting skills were maintained for eight years in an university housing cooperative after the researchers left the setting. In order to promote the program survival (i.e., response maintenance in the absence of researchers), the researchers not only trained the staff to use a manual and checklist but also trained supervisors to observe and provide feedback to the staff's performance. Johnson, Welsh, Miller, and Altus (1991) conducted their study in the same setting as Welsh et al.. The researchers trained the supervisors on a staff management system which consists of prompts, direct observation, and consequences delivered contingent upon staff's performance (e.g., contingent rent reduction). They also involved the staff when they designed the interventions (Johnson et al., 1991). The staff management system survived for five years after the researchers left the setting (Johnson et al.). The effectiveness of administrators' or supervisors' involvement was demonstrated in other setting as well. Hillman and Miller (2009) trained a spouse (i.e., natural supervisor) to use contingency contract system in promoting an asthma patient's medication adherence. The contingency contract program survived after the researchers left the setting, and the patient's medication adherence was maintained for at least nine months (Hillman & Miller, 2009).

Likewise, consumers or guardians (e.g., treatment recipients such as nursing home residents, family members of the treatment recipients) can also be involved and can reinforce both the staff intervention implementation and administrators' and supervisor's staff management (Miller, 2004). In DeWein and Miller's (2008) case study, a parent of a pre-school child with developmental disabilities (i.e., guardian) was involved and promoted the child's teacher's

response maintenance. The researchers trained the teacher to fill out and publicly post an engagement report on which she described how the child did on a behavioral engagement program; they also trained the parent to check the post regularly and provide feedback to the teacher (DeWein & Miller, 2008). The teacher's behavioral intervention implementation was maintained for at least nine months (DeWein & Miller).

In addition, the intervention programs should be designed in such ways that staff's response effort to implement the intervention is minimized, that behavioral principles that influence the staff's response (i.e., motivating operations, antecedent events, and reinforcing consequent events) are built in the treatment implementation procedures, and that local staff and their administrator witness and experience the positive outcomes generated by their implementation of intervention programs (Miller, 2004). DeWein and Miller (2008) point out the importance of minimizing staff's response effort. In their study, the guardian involvement (i.e., training the parent to check the engagement report and provide feedback to the teacher) was their program survival strategy; however, they informally observed that the use of engagement report reduced the teacher's response effort to implement the behavioral engagement program, and they discussed the possible effects that the reduced effort had on the program survival (DeWein & Miller, 2008). All behavioral interventions require implementer's (i.e., local staff's) response effort; therefore, in order to design a behavior intervention program that survive after researcher leave the setting, it is significant to investigate the effects of reduced level of response effort on program survival (DeWein & Miller).

CHAPTER 6

IMPLICATIONS FOR FUTURE RESEARCH

In order to reduce challenging behaviors in older adults with dementia in nursing home settings, it is crucial for behavior analysts and service providers (i.e., nursing homes) to train staff on correct and reliable implementation of function-based interventions. In addition to staff training, behavior analysts have to implement program survival strategies so that local staff will continue utilizing effective behavior interventions after the training: behavior interventions are typically not sustained without program survival strategies, and any effective function-based interventions or any vigorous staff training would be in vain if it were not for the strategies in place.

Despite their obvious importance, the efficacy of the program survival strategies has been evaluated in only a handful of empirical studies (Johnson et al., 1991; Welsh et al., 1994; Wu & Miller, 2012): Their efficacy with function-based behavioral interventions for older adults with dementia in nursing home settings has not been evaluated at all. Such studies can expand the functional analysis literature on population and settings by providing another experimental demonstration of function-based intervention for older adults with dementia in nursing home setting. Additionally, the results of such studies may provide rationales for the further research and development of program survival and staff management strategies in various ways. The following section outlines how a researcher might develop a study to investigate program survival strategies in aging settings.

One way to examine their effectiveness would be to conduct a series of studies involving functional analyses, intervention evaluation, staff training and support removal, and program survival strategy evaluations. In study 1, functional assessments can be conducted, which would consist of interviews to administrative and nursing staff, direct observation, and experimental

functional analyses. The purpose of study 1 is to ensure the interventions used in staff training would be developed based on data collected under optimal experimental controls.

In study 2, interventions can be developed based on the results of the functional assessments and can be implemented, in order to ensure that the function-based interventions are effective in reducing challenging behaviors. The purpose of study 2 is to ensure the interventions staff would be trained on are actually effective. It is significant to experimentally demonstrate that the interventions are effective if implemented correctly and reliably: this way, when staff stop implementing interventions, the experimenters would be able to rule out the possibility of staff not using the interventions because they are ineffective.

In study 3, staff training on the function-based interventions can be conducted, using Behavior Skills Training (Ward-Hornor & Sturmey, 2012). The frequency and procedural reliability of staff's intervention implementations can be measured and compared when behavior analysts are present in the nursing home and when they are absent. The purpose of study 3 is to investigate whether local staff would continue implementing behavioral interventions that are demonstrated to be effective even after behavior analysts leave the setting.

In study 4, some of the strategies to promote program survival suggested by Miller (e.g., minimizing staff's response effort, administrator or supervisor involvement) can be implemented. Strategies that require minimum involvement and response effort of behavior analysts can be implemented first. If they are not effective, more strategies can be added that may involve not only behavior analysts but also supervisors at the nursing homes. The purpose of study 4 is to identify one or a set of effective strategies that require as minimum involvement of behavior analysts and/or supervisors as possible. Data can be collected on the maintenance of staff's intervention

implementation to investigate whether and how the program survival strategies are effective until the data show their effectiveness or meet the termination criteria.

This chapter will discuss various implications for the methods of such a series of studies consisting of functional analyses (i.e., study 1), treatment evaluation (i.e., study 2), staff training and support removal (i.e., study 3), and program survival strategies (i.e., study 4).

Considerations for Participants

To conduct such a series of studies, two to four older adults with dementia in nursing homes would be needed. They should be those who regularly engage in problematic behaviors that would be conducive to a 5 - 10 min functional analysis condition (c.f., Hanely et al.). The experimenter can (a) conduct indirect and direct functional assessments to determine hypotheses for the functions of their challenging behavior, then (b) select two to four individuals exhibiting challenging behaviors whose functions appear to be maintained by the same function, based on the results of the functional assessments. In order to ensure that they have dementia, they would need a Mini Mental Status Examination (MMSE; Folstein, Folstein, & McHugh, 1975) score of 24 or below. The MMSE is used to assess the severity of dementia in older adults. It is an 11-item questionnaire with a perfect score of 30. Scores that are greater than 24 indicate mild cognitive impairment while 24 or below indicate moderate and severe impairments. A researcher could summarize above information obtained on each older adult participants in a table such as the one shown in Table 1.

Table 1

Sample Table of Participant Characteristics (Older Adult Participants)

Participant #	Age	Sex	MMSE	Disabilities	Medications
OA 1					
OA 2					
OA 3					
OA 4					

In addition, a range of two to four certified nurse's assistant (CNA) and their supervisors would also be needed in the studies. CNAs, primary caregivers for the older adult participants, would be needed during study 3 and 4: their supervisors would be needed only during the last phase of study 4 where program survival strategies would be evaluated. A researcher could summarize information on CNAs' and supervisors' level of education, work experience, and prior exposure to behavioral assessments and interventions in a table such as the one shown in Table 2.

Table 2

Sample Table of Participant Characteristics (CNA Participants)

Participant #	Education Level	Work Experience	Prior Exposure to Behavior Analysis
CNA 1			
CNA 2			
CNA 3			
CNA 4			

Considerations for Target Responses

In a series of study that is to evaluate (a) the response maintenance of staff implementation of function-based interventions and (b) the effectiveness of program survival strategies, two types of target responses can be measured: target responses of older adult participants and target responses of CNA participants.

Older Adult Participants. Target responses of older adult participants would be recorded throughout all studies and would be challenging behaviors that are measurable (e.g., wandering, elopement, physical aggression, verbal aggression, bending). For example, wandering might be defined as standing up and/or walking away from designated areas (e.g., activity rooms and dining rooms) when instructed to sit down, including attempts. Elopement might be defined as opening any alarm door on the special care unit and/or getting out of the unit, including attempts. Physical aggression might be defined as any behavior that results in injury or places staff and/or other residents at risks of injury, such as hitting and grabbing. Verbal aggression might be defined as any behavior that results in disruption to staff and/or other residents, such as yelling and cursing. Bending is defined as there being more than 15 inches between his back and the top of the wheelchair backrest; the beginning of the behavior is the moment when the distance between his back and the top of the wheelchair backrest starts to be longer than 15 inches, and the end is the moment when it starts to be shorter than 15 inches. Behavioral dimensions (e.g., frequency, rate, latency, duration) for each target responses to be recorded would be determined by direct observation and data collection probe, based on whether they accurately capture the responses.

The target responses of older adult participants should be hypothesized to share the same functions. Prior to study 1, the experimenter can conduct indirect and direct functional assessments (e.g., interviews, ABC data recording) in order to determine which challenging behaviors are

maintained by the same functions (i.e., attention, tangible, escape). Those with the same function would be selected as target responses and would be tested to determine if they are maintained by the same functions in experimental functional analyses in study 1.

CNA Participants. Target responses of CNAs would be recorded in study 3 and 4, and would be the implementation of function-based interventions. The implementation can be determined and defined in the following ways: In study 2, the experimenter would develop function-based interventions, each of which would (a) vary depending on each older adult participants' target behaviors and (b) involve multiple components such as stimulus presentation, consequence delivery, and data collection. The experimenter can also develop task analyses that describe each component (See Table 3, for a hypothetical task analysis). In study 3, CNAs would be trained on each component on the task analyses. In study 3 and 4, implementation of the component would be evaluated by direct observation (see below for full description of the observation system). The level of implementation (i.e., procedural integrity) would be recorded and analyzed as percentage accomplishment rate of the task analyses. The percentage accomplishment rate of task analyses can be recorded in an attempt to evaluate CNA participants' response maintenance of intervention implementation, which would involve both (a) whether they continue to implement it (i.e., generalization of intervention implementation over time) and (b) whether they continue to implement it correctly (i.e., intervention implementation with optimal procedural integrity).

Table 3

Sample Task Analysis for CNA participants

Step	Completed?

1	Did staff provide attention to Ruth at specified times? (every 20 min.)	Y / N
2	Did staff provide Ruth's preferred type of attention?	Y / N
3	Did staff put his/her initial on the data sheet after providing attention?	Y / N
4	Did staff ignore Ruth's yelling?	Y / N
5	Did staff take data on the frequency of Ruth's yelling?	Y / N
	Percentage correct	_____%

Considerations for Data collection

In order to accurately examine (a) the response maintenance of CNA's intervention implementation and (b) the effectiveness of program survival strategies, it would be essential to ensure ways to observe and take their data directly and continuously in the absence of the experimenter. The issue that is common in clinical settings and is to be addressed in a study on program survival strategies is that local staff typically stop implementing behavior interventions once behavior analysts finish training and leave the setting. Therefore, the experimenters would first need to compare CNA's data when the experimenters are present (i.e., experimenter-present phases) and when they are absent (i.e., experimenter-absent phases). Experimenter-present phases would be all phases in study 1 and study 2, and B phases (i.e.., baseline) in study 3: Experimenter-absent phases would be A phases (i.e., intervention) in study 3 and all phases in study 4. To compare CNA's data in the experimenter-present conditions and experimenter-absent conditions, the experimenters would need ways to directly observe and collect data on CNA's intervention implementation when the experimenters themselves are actually not present at the nursing home: it is crucial that CNA participants would think that the experimenters are neither

observing nor collecting data on them, in order to accurately examine their response maintenance and program survival strategies.

To do so, the following two strategies can be used: (a) to utilize different groups of data collectors in experimenter-present phases and experimenter-absent phases and (b) to utilize a video camera only in experimenter-present phases and not in experimenter-absent conditions.

Experimenters' assistants vs. confederate data collectors. In order to collect accurate data on CNA participants' response maintenance (i.e., whether they continue intervention implementation in the absence of the experimenters), the experimenters can utilize one group of data collectors in experimenter-present phases and the other group in experimenter-absent phases. The first group of data collectors can be called as "experimenters' assistants": the second group can be called as "confederate data collectors." The experimenters can utilize the "experimenters assistants" only in the experimenter-present phases and can train them in a way that CNA participants would associate them with the experimenters and their studies. For example, they can introduce themselves to CNA participants as "the experimenters' assistants," conduct interviews with the CNA participants as a part of the studies, and assist the experimenters in the presence of CNA participants. The purpose would be to get the CNA participants to associate them with the experimenters and their studies.

On the other hand, the experimenters can train the confederate data collectors in a way that the CNA participants would associate them with neither the experimenters nor their studies. For example, the experimenters can choose the confederate data collectors from those who have already been working at the nursing homes and the local staff, including the CNA participants are familiar with. Or, they can have the confederate data collectors work on totally different projects in the nursing homes when, or even before they start conducting their studies. Or, they can explain to

CNA participants that the confederate data collectors' observation and data collection are their job as interns (Bloom, Fischer, & Orme, 2009). They can also train the confederate data collectors to not assist them during the experimenter-present conditions in the nursing homes, where the CNA participants can see the data collectors with them. Or, they can have the data collectors work on a different project. In addition, prior to the study, the experimenters can inform the CNA participants that the observation and data on their intervention implementation would not be reported to their supervisors or administrators and would not affect their job security in any way (Miller, 2004). The purpose would be to get the CNA participants to associate the confederate data collectors neither with the experimenters nor with their studies: it is crucial that the CNA participants are accustomed to the presence of confederate data collectors and think they are neither observed nor collected data on during experimenter-absent conditions.

The experimenters can also train the confederate data collectors on ways to minimize reactivity of the CNA participants. For example, they can be trained to minimize the obtrusiveness of their observational process by "positioning away from the ordinary flow of movement while still allowing an unobstructed view of the entire area" or by filling out data sheet out of the view of CNA participants (Bloom et al., 2009; Bracket, Reid, & Green, 2007). They can also be trained to make their presence as unobtrusive as possible by refraining from eye contacts and social interactions with the CNA and older adult participants, by entering the setting before a session rather than during one, by following all formal and informal rules and regulations of the nursing homes, or by not wear anything unusual which can attract attention (Bloom et al.; Bracket et al.; Miller, 2004).

Use of video camera. Another way to collect accurate data on CNA participants' response maintenance and to evaluate the effectiveness of program survival strategies in the absence of the

experimenters would be to utilize a video camera only in experimenter-present phases. Video camera can be used to aide in establishing stimulus control: by using a video camera only in experimenter-present phases, the experimenters can make it more probable that CNA participants would associate the experimenters' assistants with the experimenters and their studies but not the confederate data collectors. It is essential to make a clear differentiation between (a) experimenter-present conditions where at least some reactivity will be expected and (b) experimenter-absent conditions where such reactivity should be minimized. The stimulus control can be established by using two types of data collectors as described above and by using a video camera only in experimenter-present conditions. Video recording can aide in establishing the stimulus control.

Additionally, video camera can be used to train the confederate data collectors as well. The experimenters would train both the experimenters' assistants and the confederate data collectors, using verbal and written instructions of data collecting procedures, modeling, and role-playing. However, the confederate data collectors would not be able to be present in the nursing homes and directly observe the older adult participants' target responses during the experimenter-present conditions. Therefore, the experimenters' assistants can record all the sessions using the video camera in experimenter-present conditions, and the confederate data collectors can be trained on data collection using the video clips until they show proficiency (i.e., at least 90 percent IOA). Video recording would be essential to ensure the consistency and accuracy of data collection in this series of studies on program survival strategies.

Inter observer agreement and procedural integrity. A second observer would be present in for at least 30% of all sessions throughout all studies. Two types of inter observer agreement would be obtained in this study: IOA for target responses of older adult participants and

IOA for target response of CNA participants. IOA for older adult participants' target responses would be obtained throughout all studies and would be obtained by computing trial-by-trial IOA: the occurrence or nonoccurrence of behaviors would be recorded for each response opportunities. The agreement between two observers would be calculated by dividing number of agreed response opportunities by total number of response opportunities and multiplying it by 100%. IOA for the percentage accomplishment rates for the CNAs' intervention implementations would be obtained in study 3 and 4 and would be computed by dividing the higher percentages by the lower percentages and multiplying it by 100%.

Two types of procedural reliability would be obtained in this study. In study 1, 2, and 3, procedural integrity for the experimenter's implementation of experimental procedures would be obtained. The experimenter and secondary observer would take data on the experimenter's proper implementation of the experimental procedures, using task analysis. The number of tasks completed appropriately would be recorded, and the percentage of correct implementation would be calculated. In study 3 and 4, procedural integrity for CNAs' intervention implementation would be recorded, as described in previous section.

Target response of supervisor participants would be recorded in study 4, and would be their procedural reliability. In study 4, the experimenters would develop a task analysis for the supervisor participants to use as a part of the implementation of program survival strategies (See Table 4). Data can be corrected on how accurately they complete the task analysis, to ensure that program survival strategies are implemented accurately and to ensure the internal validity.

Table 4

Sample Hierarchy of Program Survival Strategies

Level	Program Survival Strategies
1 Support from behavior analysts	• Create a check-sheet of materials necessary for intervention implementation. • Create a flowchart of intervention implementation. • Create step-by-step instructions. • Add visual aides to written instructions. • Prepare an already filled-out data sheet as an example/reference. • Put important information (e.g., operational definitions) on a laminated card with strings so CNAs can wear it.
2 Support from advisors and/or supervisors	• Train supervisors to instruct CNAs to wear the laminated card all the time. • Have administrators and supervisors to sit in on the trainings for CNAs. • Train supervisors to directly observe CNAs performance. • Train supervisors to check data sheets periodically. • Train supervisors to provide consequences (e.g., verbal praises).

Considerations for Experimental Design

As described earlier, the experimenter can conduct a series of studies to examine the effectiveness of program survival strategies: functional analyses can be conducted in study 1, intervention evaluation in study 2, staff training and support removal in study 3, and program survival strategies evaluation in study 4. To maximize experimental control, different experimental designs can be used in each studies.

In study 1, functional analysis can be conducted using multielement design (Ulman & Sulzer-Azaroff, 1975). Level, trend, and stability of behavior would be observed across two or more condition (e.g., attention, demand, alone, and control), depending on each target response, and the experimental conditions can be rapidly alternated (Hanley et al., 2003). A researcher could present the data in a graph such as the one shown in Figure 1.
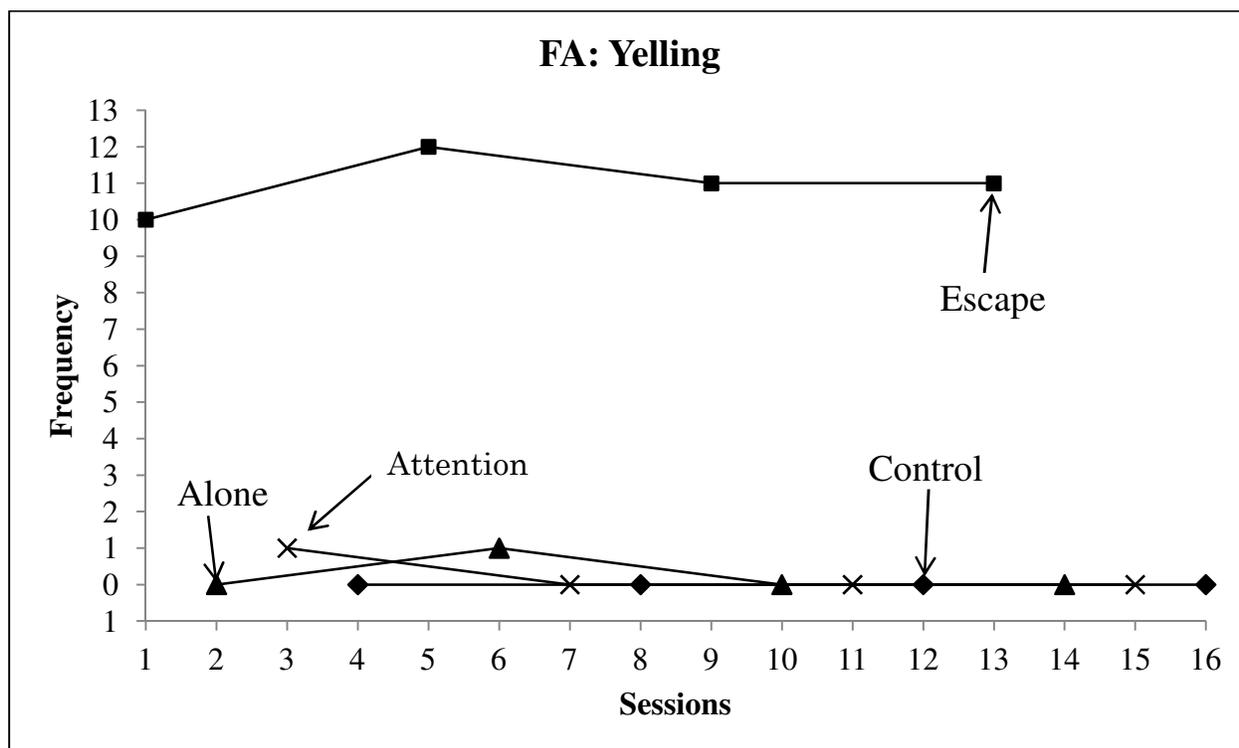

Figure 1. Study 1 sample graph.

In study 2, the evaluation of individualized function-based interventions can be conducted using an ABAB reversal design (Kazdin, 2003). Function-based interventions would be present in A phase while it would be absent in B phase. The phases would be changed when the data are stable based on visual inspection of level, trend and stability. A researcher could present the data in a graph such as the one shown in Figure 2.
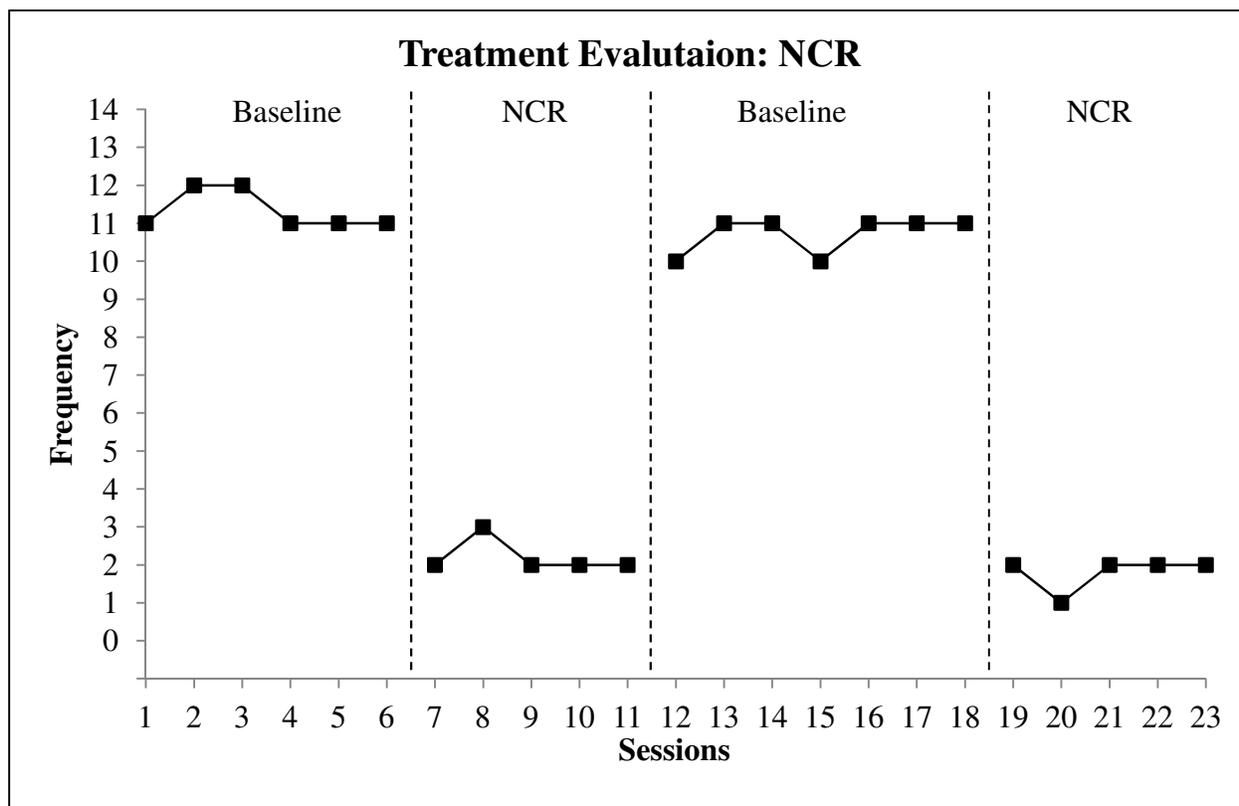
Figure 2. Study 2 sample graph.

During study 3, the evaluation of maintenance training can be conducted using a BABA design. Experimenter supports (i.e., direct observation, feedback) would be in place during B phases, while experimenter supports would be removed during A phases, with the ultimate goal that implementation would occur during later B phases. A researcher could present the data (i.e., the level of older adults' challenging behaviors and CNA participants' procedural reliability) in a graph such as the one shown in Figure 3.
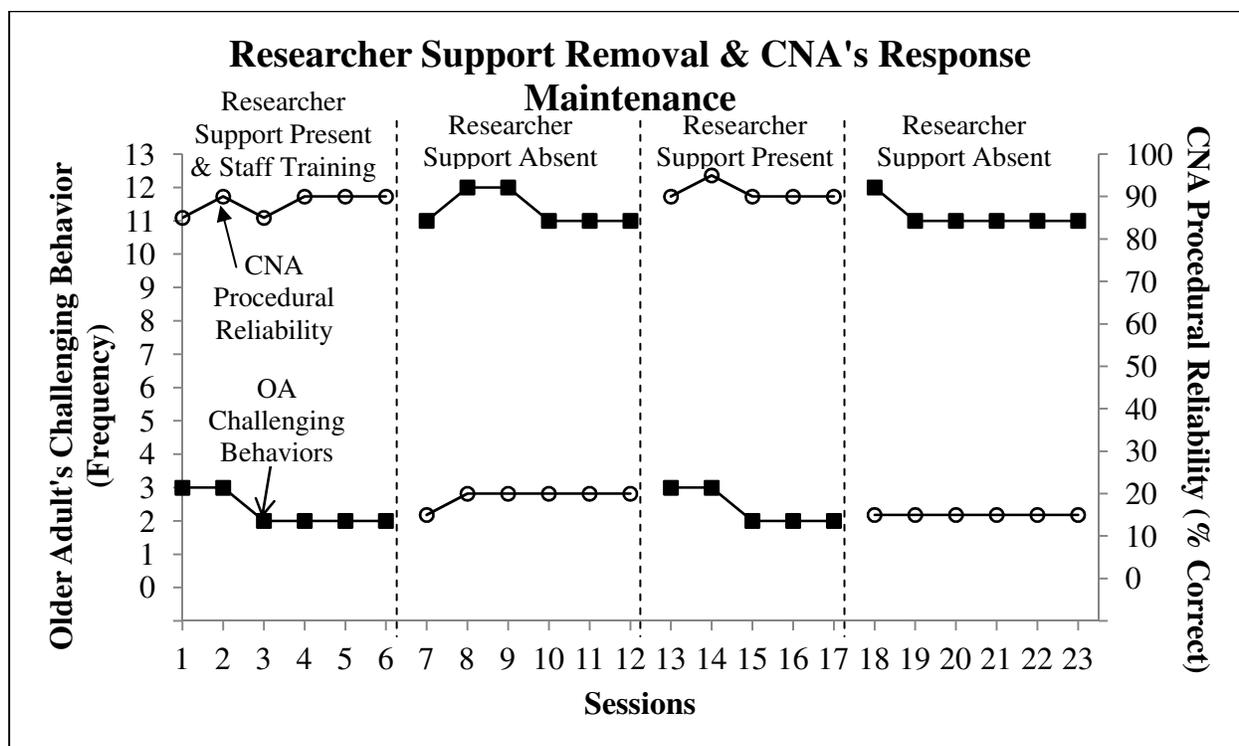
Figure 3. Study 3 sample graph.

During study 4, the evaluation of program survival strategies (Miller) can be conducted using a multiple-baseline design across staff. A few program survival intervention packages with different levels of feasibility and response effort can be prepared. For example, program survival intervention package (level 1) would consist of the easiest strategies that require minimum involvement and response efforts of experimenters. After data in the last phase of study 4, which functions as a baseline of multiple-baseline design, is stabilized, the intervention packages can be implemented cumulatively until the data indicate the effectiveness of program survival strategies. For example, the level 1 package can be implemented first, and the level 1 and level 2 packages can both be implemented, if the level 1 package was not effective.

Previous studies used a withdrawal design to evaluate the effectiveness of their program survival strategies (DeWein et al.; Johnson et al.; Welsh et al.); however, Miller (2004) defines

program survival as "the continued use of a behavioral program by its natural implementers under the direct control or the indirect control of the outcomes generated by that program." When programs survive, natural implementers' (i.e., local staff such as CNAs) behaviors are under the control of contingencies in the natural environment; therefore, in order to evaluate the effectiveness of program survival strategies, the strategies cannot be removed. In situations where independent variables cannot be removed, multiple-baseline design can be used (Bloom et al., 2009). A researcher could present the data (i.e., the level of older adults' challenging behaviors and CNA participants' procedural reliability) in a graph such as the one shown in Figure 4.
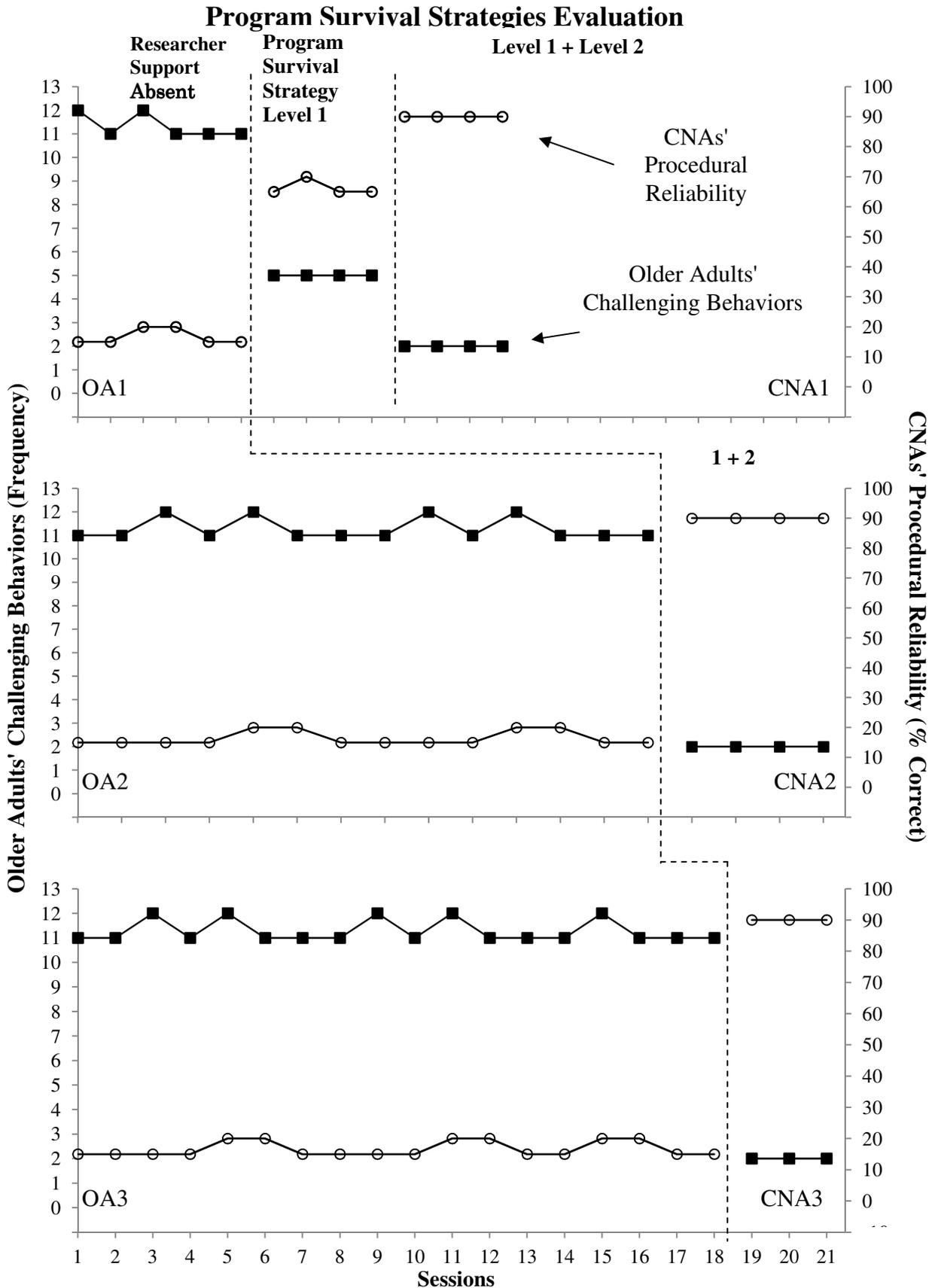
Program Survival Strategies Evaluation

Figure 4. *Study 4 sample graph*

Procedures for Studying Program Survival

Implications for detailed procedure for each studies are summarized below.

Study 1: Functional assessment. Study 1 would consist of experimenter-present phases: the experimenters and the "experimenter's assistants" would be present in the nursing homes and conduct the study. During the first part of the functional assessment, the researchers can administer the questions about behavioral functions (QABF; Matson & Vollmer, 1995) with at least two administrative and nursing staff for each target response. The QABF consists of 25 questions, each of which is designed to assess attention, escape, non-social, physical, or tangible function of behavior. Psychometric analyses on the QABF have shown that that the QABF has adequate psychometric properties, such as five-factor structure, adequate subscale internal consistency, good inter-rater reliabilities, and convergent validity with the Motivation Assessment Scale and analog functional analysis (Freeman, Walker, & Kaufman, 2007).

Direct observations can also be conducted, using ABC continuous recording. The experimenters can develop a data collection form on which the target responses and antecedents and consequences are specified based on the interviews. The experimenters or their assistants would record the occurrences of the target responses and their antecedents and consequences in their natural environment for a period of time. ABC continuous recording should not interrupt older adult participants' daily routine and should be conducted in their natural environment in which the target responses occur; therefore, the information obtained from the ABC recording could be used to design an experimental functional analysis that can subsequently be conducted.

After the interviews and direct observations, experimental functional analysis can be conducted (Iwata et al., 1982/1994). During the test conditions, predetermined consequences such as attention, escape from demand, and automatic reinforcement would be provided contingent on

the occurrence of target response in each of the attention, demand, alone, respectively. The control

conditions would involve the time based delivery of putative reinforcers. The levels of target

responses during the test conditions would be compared to the levels observed during the control

condition. To conduct an experimental functional analysis test condition, three components would

be necessary: a motivating operation, a discriminative stimulus, and the delivery of the putative

reinforcer following the target behavior. The following sections provide examples of how these

components can be used in hypothetical test conditions.

In the attention condition, a motivating operation should be deprivation from attention. In

order to create the state of deprivation, the pre-session attention can be withheld by conducting

alone condition prior to the attention condition (Iwata et al., 1994). Discriminative stimuli can be

the presence of staff and a predetermined color (e.g., red shirt worn by the experimenter). The

experimenter can tell the older adult participant that she has work to do and would be sitting in the

other corner of the room, pretending to read something of that nature. Since reinforcement in the

attention condition is attention, the experimenter would provide social attention for 5 to 10 seconds

as soon as the participants engage in the identified target response. The social attention can be

modeled after staff attention toward residents in their natural environment, based on the direct

observation conducted prior to the experimental functional analysis. Attention, and only attention,

would be provided for the target response and no consequences would be provided for any other

behaviors. No preferred items would be present in the room either.

In the escape condition, a motivating operation should be deprivation from break from

demands, and discriminative stimuli would be the presentation of demands and a predetermined

color (e.g., a blue shirt worn by the experimenter). In order to create the state of deprivation, the

experimenter can provide demands on a 30-s schedule. Idiosyncratic antecedent events such as

task difficulty and social interaction can be determined based on the direct observation conducted prior to the experimental functional analysis (Hanley et al. 2003). Since reinforcement in this condition is the termination of demands, five to 10 seconds of escape from the demands, and only escape from the demands, would be provided immediately after and contingently upon the occurrence of the identified target response. If the participants did not respond at all or incorrectly, least to most prompts can be used. No consequence would be provided for any other behaviors. No preferred items should be present in the room either.

In the alone condition, a motivating operation should be the deprivation from automatic reinforcement. If a target response is evoked by certain stimuli (e.g., bending to pick up small objects on the floor), discriminative stimuli would be the presence of stimuli signaling the availability of automatic reinforcement (e.g., small objects on the floor) and a predetermined color which signals socially mediated consequences would not be delivered (e.g., yellow shirt). If a target behavior is evoked by stimuli that are always present (e.g., eye poking), discriminative stimulus would be the presentation of the predetermined color which signals socially mediated consequences would not be delivered (e.g., yellow shirt). The participants should be left alone in a room to remove any influence of social reinforcement, and the session would be recorded on a video tape. Since reinforcement in this condition is automatic reinforcer that usually cannot be controlled or directly manipulated, no consequence would be provided for any behaviors including the identified target response. No preferred items should be present in the room either.

In the control condition, in order to eliminate motivating variables (i.e., deprivation from attention, break from demands, and stimulation), the experimenter can provide 5 to 10 seconds of social attention on a fixed-time 30-s schedule, and no demands should be presented. Also, the

participants would be provided with free access to a variety of their favorite items (e.g., cross word puzzles, dominos, CD players, snacks) throughout a session.

Study 2: Function-based intervention. Study 2 would consist of experimenter-present phases: the experimenters and the "experimenter's assistants" would be present in the nursing homes and conduct the study. At the beginning of this study, function-based interventions would be developed for each target responses, based on the results of experimental functional analysis in study 1. A step-by-step task analyses can also be created for each intervention in order to evaluate the experimenter's and CNA participants' procedural integrity in Study 3 and 4. Interventions would be individually developed according to the results of the functional analysis in study 1, but basic designs are discussed below.

Interventions for attention-maintained behaviors might consist of ignoring the inappropriate behaviors and providing reinforcement for the absence of the problem behaviors or for appropriate behaviors; or, the interventions might involve the time-based delivery of attention. Interventions for escape-maintained behaviors might consist of continuing placing demands upon the occurrence of the problem behaviors and providing breaks contingent upon the compliance to the demands or on fixed-time schedule. Interventions for behaviors maintained by automatic reinforcement might consist of blocking the problem behaviors and providing free continuous access to items which generate the same automatic reinforcement.

After developing the interventions, the experimenters would implement them and evaluate their effectiveness, using ABAB reversal design. The function-based intervention would be absent in A phases and present in B phases. The phases would be changed when the data are stable based on visual inspection of level, trend, and stability.

Study 3: Staff Training and Support Removal. Study 3 would consist of both experimenter-present phases and experimenter-absent phases. The experimenters and the "experimenter's assistants" would be present in the nursing homes and conduct the study during the initial staff training and B phases (i.e., intervention, involving experimenter's direct observation and feedback): the experimenters and their assistants would be absent and the "confederate data collectors" would be present and collect data during A phases (i.e., baseline, involving no experimenter support).

At the beginning of the study, the experimenters would train CNA participants to implement the function-based interventions through Behavioral Skills Training (BST) (Ward-Horner & Sturmey, 2012). BST has been used in training individuals on the implementation of behavior-analytic techniques, including functional analyses (Iwata et al., 1982/1994; Moore et al., 2002; Wallace, Doney, Mintz-Resudek, & Tarbox, 2004). Behavioral skills training (BST) typically includes a combination of rationales, verbal instruction with the task analysis, models by the experimenter, role-playing, performance feedback (Miles & Wilder, 2007).

First, the experimenters can explain the reasons why the skills to implement function-based interventions would be taught (Reid & Parsons, 2002). For example, they might explain how non-contingent reinforcement (NCR) procedure has successfully been used to reduce attention-maintained aggressive behaviors in numerous research studies. Second, the experimenters can verbally explain what exactly steps the intervention implementation would involve; the detailed descriptions of the steps of intervention implementation can also be provided in written forms (Reid & Parsons). For example, they can (a) give CNA participants a copy of the list of the operational definitions of the skills involved in intervention implementation and task

analysis specifying each step, and then (b) verbally go over the list and task analysis. Third, the experimenters can demonstrate the skills involved in intervention implementation and "all performance expectations related to the target skills" in front of the CNA participants (Reid & Parsons). They can demonstrate how to provide attention every 10 minutes. Fourth, the experimenters can have the CNA participants practice the target skills and observe their performance (Reid & Parsons). They can observe the CNA participants' talking to another CNA participant who is playing a role of an older adult participant, every 10 minutes. Fifth, the experimenters can provide the CNA participants with performance feedback regarding how well they complete the steps of intervention implementation (Reid & Parsons). They can tell the participants how many steps of NCR interventions they implement correctly. The training would take about 30 min (Baker et al., 2006). After CNA participants meet the training termination criteria (i.e., 90% completion of task analysis in three sessions), CNAs would implement the interventions.

After it is demonstrated that CNA participants are able to implement function-based interventions in the first phase, which functions as the first baseline in an ABAB design, the CNAs' response maintenance can be examined. The data on the CNA participants' intervention implementation and the older adult participants' behaviors can be collected after the experimenters leave the nursing home: all of the supports that the experimenters provided for the intervention implementation (i.e., direct observation and feedback) would be withdrawn. The response maintenance (i.e., the effects of maintenance training) would be evaluated in a BAB reversal design. Experimenters' supports would be present in A phase while they would be absent in B phases; the ultimate goal would be to demonstrate the CNA participants' intervention implementation response would be maintained during later A phases.

Study 4: Evaluation of Program Survival Strategies. Study 4 would consist of experimenter-absent phases: the experimenters and the "experimenter's assistants" would be absent in the nursing homes while the "confederate data collectors" would be present, observe, and collect data. In this study, the effectiveness of program survival strategies can be evaluated in a multiple-baseline design across staff. The last phase of study 3 would be used as a baseline (i.e., no experimenter support including direct observation and feedback). In intervention phases, two levels of program survival strategies can be implemented cumulatively (See Table 4, for a hypothetical program survival hierarchy/packages). First, level 1 strategies would be implemented. If the level 1 strategies are not effective in promoting staff's response maintenance, level 1 plus level 2 strategies would be both implemented. Data collection would be continued until the experiment termination criterion is met (i.e., data stability indicated by three stable consecutive data points). After the data collection is terminated, the feasibility of program survival strategies can be rated by the experimenters.

Level 1 strategies would be to minimize staff's response effort in intervention implementation and require the experimenters' support only. The experimenters can simplify the interventions developed in study 2 as much as possible, so that they require the CNA participants' minimum response effort to implement them (Miller, 2004). For example, the data sheets can be developed in ways to make data collection simple and easy. The experimenter can instruct supervisors to make sure that there are enough copies of data sheets and they are placed right by the residents' charts so they are readily available whenever the CNA participants need them. The experimenter can also take CNA participants' daily routines in considerations when developing the interventions in order to make sure that they are able to implement them with minimum interruptions to their other tasks; for instance, interventions for an attention-maintained physical

aggression can be for them to provide attention every hour and might be implemented when they take the older adult participant to bathroom or handing out water.

Level 2 strategies would involve both the experimenters' and supervisors' support. The experimenters can first arrange the CNA participants' environment in such ways that their implementing behaviors would be motivated and reinforced, using behavioral principles (Miller, 2004). For example, the experimenters can provide antecedent instructions such as detailed descriptions specifying CNA participants' responsibilities and assignments in the intervention implementation; "how, when, where, and by whom a task should be completed" would be specified (Burgio & Burgio, 1990; Ludervold & Lewin, 1992). The copies of the descriptions can be placed right by the older adult participants' chart and data sheet. The descriptions might play a role of an easy reference for CNA participants to check their own behaviors (Allen-Burge et al., 1999; Burgio et al., 2002; Stevens et al., 1998). In addition, the experimenters can train CNA's supervisors to apply consequences for their performance; positive consequences such as verbal praise can be delivered contingently upon their appropriate intervention implementation (Burgio & Burgio; Ludervold & Lewin). Feedback can be delivered as well. Feedback can be (a) in verbal, written, and/or graphic forms, (b) provided privately or publicly, and (c) based on individual or group performance.

In addition to arranging the CNA participants' environment, the experimenters can also train the CNAs' supervisors to provide supports to their intervention implementation. A few studies have demonstrated the effectiveness of guardians' involvement on program survival (DeWein & Miller, 2008); however, in nursing home settings, guardians of older adults with dementia are typically neither easily accessible nor usually present. Therefore, in nursing home settings, especially in the special care unit for older adults with dementia, it would be more

realistic and practical to involve supervisors. In order to promote program survival, the experimenters can train supervisors to observe the CNA participants' performance and provide consequences contingently upon their performance. For example, supervisors can add "Behavioral Intervention Implementation" to the CNA participants' performance evaluation. They can also observe their intervention implementation and check the data sheet periodically and provide verbal praises to those who implemented the interventions correctly during a staff meeting.

Finally, the feasibility of program survival strategies can be rated by the experimenters and can be classified into several levels in the feasibility hierarchy. Strategies on the same level would construct an intervention package (See Table 4, for a hypothetical program survival hierarchy/packages). The intervention packages would be implemented cumulatively in order to evaluate the effectiveness of the program survival strategies and to identify which level on the hierarchy would be necessary for behavioral interventions to survive in a nursing home after the experimenters leave the setting. The experiment termination criterion is the data stability indicated by three stable consecutive data points.

Chapter 7

SUMMARY

Behavior interventions have, and will become more and more valuable in caring for older adults with dementia. The number of older adults with dementia is predicted to increase dramatically in the next few decades since the baby boomers began turning 65 in 2011 (Older Americans, 2012), and the number of service providers for the population such as nursing homes will have to increase. A large portion of nursing home residents have dementia, and they are prone to engaging in challenging behaviors (e.g., aggression) (Burgio & Burgeois, 1992). In an attempt to reduce challenging behaviors in demented patients, the use of atypical anti-psychotic medications has been increasing in nursing homes in spite of the facts that the use of behavioral interventions is mandated in the OBRA prior to any use of medications, and that adverse effects of such medications have been widely reported. Compared to medical restraints, behavioral interventions are safer, much less invasive, and typically more positive.

Several studies on function-based interventions have demonstrated that they are effective in reducing challenging behaviors in older adults with dementia (Dwyer-Moore & Dixon, 2007). It has, however, been widely observed that local staff's intervention implementation is typically not maintained after behavior analysts conduct staff trainings and leave the setting; behavioral intervention programs often do not survive after behavior analysts leave the setting (Miller, 2004). Miller (2004) suggests several strategies to promote program survival: however, the effectiveness of the strategies has rarely been demonstrated in empirical studies. Studies on program survival strategies may encourage researchers to investigate more on the sustainability of behavioral interventions and may prompt further development of program survival and staff management strategies in a variety of ways.

One way to evaluate the effectiveness of the program survival strategies would be to conduct a series of studies involving functional assessments, intervention evaluations, staff training and support removal, and program survival strategies evaluations. First, functional assessments consisting of interviews to staff, direct observation, and experimental functional analysis can be conducted. Second, interventions can be developed based on the results of the functional assessments and implemented to ensure that the function-based interventions are effective in reducing challenging behaviors. Third, local staff such as CNAs in nursing homes can be trained on the interventions implementation; the procedural reliability of staff's intervention implementations can be measured after primary experimenter leaves the setting to evaluate the effects of experimenter support (i.e., primary experimenter's direct observation and feedback) on staff's response maintenance. Fourth, program survival strategies can be implemented and evaluated.

In order to conduct such studies, it is essential to accurately examine the response maintenance of local staff's intervention implementation and the effectiveness of program survival strategies. Experimenters need ways to observe staff directly and take their data continuously when they themselves are not present in the facility. To evaluate local staff's response maintenance and efficacy of program survival strategies, the experimenters themselves cannot be present at the facility so that the studies represent what actually happens in natural settings: that is, local staff typically stop implementing behavior interventions once behavior analysts finish training and leave the setting. To observe and collect data on local staff in the absence of the experimenters, they can utilize different groups of data collectors in experimenter-present phases and experimenter-absent phases and utilize a video camera only in experimenter-present phases and not in experimenter-absent conditions.

There have been a number of studies that demonstrate the effectiveness of function-based interventions in reducing challenging behaviors; however, they can be beneficial to consumers and clients only if local staff continue to implement them even after behavior analysts leave the setting and stop observing them.

46

REFERENCES

Altus, D. E., Welsh, T. M., & Miller, L. K. (1991). A technology for program maintenance: Programming key researcher behaviors in a student housing cooperative. *Journal of Applied Behavior Analysis, 24*, 667-675. doi: 10.1901/jaba.1991.24-667

Alzheimer's Disease Facts and Figures 2010. Retrieved from http://www.alz.org/documents_custom/report_alzfactsfigures2010.pdf

Baker, J. C., Hanley, G. P., & Mathews, R. M. (2006). Staff administered functional analysis and treatment of aggression by an elder with dementia. *Journal of Applied Behavior Analysis, 39*, 469-474. doi: 10.1901/jaba.2006.80-05.

Baker, J. C, & LeBlanc, L, A. (2011). Acceptability of interventions for aggressive behavior in long-term care settings: Comparing ratings and hierarchical selection. *Behavior Therapy, 42*, 30-41. doi: 10.1016/j.beth.2010.04.005

Bloom, M., Fischer, J., & Orme, J. G. (2009). *Evaluating practice: Guidelines for the accountable professional* (6th ed.). Boston, MA: Allyn and Bacon.

Brackett, L., Reid, D.H., & Green, C.W. (2007). Effects of reactivity to observations on staff performance. *Journal of Applied Behavior Analysis, 40*, 191-195. doi: 10.1901/jaba.2007.112-05.

Buchanan, J. A., & Fisher, J. E. (2002). The use of noncontingent reinforcement in the treatment of disruptive vocalization in elderly dementia patients. *Journal of Applied Behavior Analysis, 35*, 99-103. doi: 10.1901/jaba.2002.35-99.

Buchanan, J., Husfeldt, J., Berg, T., & Houlihan, D. (2008). Publication trends in behavioral gerontology in the past 25 years: Are the elderly still an understudied population in behavioral research? Behavioral Interventions, 23, 65-74. doi: 10.1002/bin.254

Burgio, L., & Burgio, K. (1990). Institutional staff training and management: A review of the literature and a model for geriatric, long-term-care facilities. *International Journal of Aging and Human Development, 30*, 287-302.

Burgio, L., & Bourgeois, M. (1992). Treating severe behavioral disorders in geriatric residential settings. *Behavioral Interventions, 7*, 145-168. doi: 10.1002/bin.2360070206

Carr, J. E., Coriaty, S., & Dozier, C. L. (2000). Current issues in the function-based treatment of aberrant behavior in individuals with developmental disabilities. In Austin J. & Carr, J. E. (Eds.), *Handbook of applied behavior analysis* (pp. 91-112). Reno, NV: Context Press.

Cassidey, E. L., Davies, H., O'Hara, R., Mumenthaler, M. S., Buffum, M., Tsui, P., Shakoori, R., Danielsen, C., & Sheikh, J. I. (2001). Behavior Problems in older adults in acute care settings: Challenges for staff. *Clinical Gerontologist, 24*, 3-13.

Couch, R. W., Miller, K. L., Johnson, M., & Welsh, T. M. (1986). Some considerations for behavior analysts developing social change interventions. *Behavior Analysis and Social Action, 5*, 9-13.

DeWein, M., & Miller, L. K. (2008). The effect of a teacher report on the sustainability of an intervention to facilitate engagement by a child with developmental delay. *Education and Treatment of Children, 31*, 333-349.

Dweyer-Moore, K. J., & Dixon, M. R. (2007). Functional analysis and treatment of problem behavior of elderly adults in long-term care. *Journal of Applied Behavior Analysis, 40*, 679-683. doi: 10.1901/jaba.2007.679-683.

Folstein, M.F., Folstein, S.E., & McHugh, P.R. (1975). Mini-mental state: A practical method

for grading the cognitive state of patients for the clinician. *Journal of Psychiatric Research, 12*, 189-198.

Hanley, G. P., Iwata, B. A., & McCord, B. E. (2003). Functional analysis of problem behavior: A review. *Journal of Applied Behavior Analysis, 36*, 147-185. doi: 10.1901/jaba.2003.36-147

Hawkins, A. M., Burgio, L. D., Langford, A., & Engle, B. T. (1992). The effects of verbal and written supervisory feedback on staff compliance with assigned prompted voiding in a nursing home. *Journal of Organizational Behavior Management, 13*, 137-150. doi: 10.1300/J075v13n01_09

Heard, K., & Watson, T. S. (1999). Reducing wandering by persons with dementia using differential reinforcement. *Journal of Applied Behavior Analysis, 32*, 381-384. doi: 10.1901/jaba.1999.32-381

Hillman, H. L., & Miller, K. L. (2009). The effects of a Spouse Implemented Contingency Contract on Asthma Medication Adherence. *The Behavior Analyst Today, 10*, 372-380.

Iwata, B. A., Dorsey, M. F., Slifer, K. J., Bauman, K. E., & Richman, G. S., (1982). Toward a functional analysis of self-injury. *Analysis and Intervention in Developmental Disabilities, 2*, 3-20.

Iwata, B. A., Dorsey, M. F., Slifer, K. J., Bauman, K. E., & Richman, G. S., (1994). Toward a functional analysis of self-injury. *Journal of Applied Behavior Analysis, 27*, 197-209. doi: 10.1901/jaba.1994.27-197.

Johnson, S. P., Welsh, T. M., Miller, L. K., & Altus, D. E. (1991). Participatory management: Maintaining staff performance in a university housing cooperative. *Journal of Applied Behavior Analysis, 24*, 119-127. doi: 10.1901/jaba.1991.24-119

Kamble, P., Chen, H., Sherer, J. T., & Aparasu, R. R. (2009). Use of antipsychotics among

      elderly nursing home residents with dementia in the US: An analysis of national

      survey data. *Drugs & Aging, 26*, 483-492. doi: 10.2165/00002512-200926060-00005

Lundervold, D. A., & Lewin, L. M. (1992). Staff training and management: A critical component

      for changing resident behavior. In D. A. Lundervold & L. M. Lewin (Ed.), Behavior

      analysis and therapy in nursing homes (pp 116-125). Springfield, Il: Charles C. Thomas.

Miller, L. K. (2004). Syllabus for HDFL 940. Unpublished manuscript, Department of Applied

      Behavioral Science, Department of Psychology, University of Kansas, United States of

      America.

Older Americans 2012: Key Indicators of Well-Being. Retrieved from

      http://www.agingstats.gov/Main_Site/Data/2012_Documents/docs/EntireChartbook.pdf

Stevens, A. D., Burgio, L. D., Bailey, E., Burgio, K. L., Paul, P., Capilouto, E., Nicovich, P., &

      Hale, G. (1998). Teaching and maintaining behavior management skills with nursing

      assistants in a nursing home. *The Gerontologist, 38*, 379-384.

Street, J. S., Clark W. S., Gannon, K. S., Cummings J. L., Bymaster, F. P., Tamura, R. N.,

      …Breier, A. (2000). Olanzapine treatment of psychotic and behavioral symptoms in

      patients with Alzheimer disease in nursing care facilities: a double-blind, randomized,

      placebo-controlled trial. *Archives of General Psychiatry, 57*, 968-976.

Teri, L., Truax, P., Logston, R., Uomoto, J., Zarid, S., & Vitaliano, P. P. (1992). Assessment of

      behavioral problems in dementia: The Revised Memory and Behavior Problems

      Checklist. *Psychology and Aging, 7*, 622-631. doi: 10.1037/0882-7974.7.4.622

Ulman, J. D., & Sulzer-Azaroff, B. (1975). Multielement baseline design in educational research.

      In E. Ramp & G. Semb (Eds.), *Behavior analysis: Areas of research and application*

(pp. 371-391). Englewood Cliffs, NJ: Prentice-Hall.

Ward-Hornor, J. & Sturmey, P. (2012). Component analysis of behavior skills training in

functional analysis. *Behavioral Interventions, 27*, 75-92. doi: 10.1002/bin.1339

Welsh, T. M., Miller, L. K., & Altus, D. E. (1994). Programming for survival: A meeting system

that survives 8 years later. *Journal of Applied Behavior Analysis, 27*, 423-433. doi:

10.1901/jaba.1994.27-423

Wu, Hang & Miller, K. L. (2012). An experimental analysis of the effectiveness and

sustainability of a Chinese tutoring package. *Journal of Applied Behavior Analysis,*

45, 217-221. doi: 10.1901/jaba.2012.45-217

VITA

Graduate School
Southern Illinois University

Kazu Takeguchi

kazutakeguchi@gmail.com

University of Nevada, Reno
Bachelor of Arts, Psychology, December 2008

Research Paper Title:
      A Review of Empirical Approaches to Maintenance of Staff Implementation of Function
      Based Interventions Nursing Home Settings

Major Professor: Dr. Jonathan C. Baker