# APPLIED BEHAVIOR ANALYSIS AS A TREATMENT FRAMEWORK FOR VARIOUS DEMENTIAS

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# PRESENTER DISCLOSURE

The presenter does not have any financial or nonfinancial consideration or relationship relevant to course content that compromises or has the potential to compromise professional judgment.

Loving Husband, Father, and Grandfather

Proud Supporter of Education and Learning

Victim of Frontotemporal Dementia

**THIS PRESENTATION IS DEDICATED TO THE MEMORY OF LARRY E. MASON SEPTEMBER 7, 1947 - FEBRUARY 5, 2011**

# LEARNER OBJECTIVES

1. The learner will be able to identify at least three treatment methods that have been proven effective for patients with dementia in recent research studies.

2. The learner will be able to define the concepts of ABA.

3. The learner will be able to establish relationship between patient behavior and patient environment/communication level.

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# **DIFFERENTIAL DIAGNOSIS:**

# **ALZHEIMER'S DISEASE, MULTI-INFARCT DEMENTIA, AND FRONTOTEMPORAL DEMENTIA**

# ALZHEIMER'S DEMENTIA: NEUROPATHOLOGIES

- Neurofibrillary Tangles
- Senile Plaques
- Brain Atrophy
- Primary damage to hippocampus and the temporal and parietal lobes
- Gene mutations associated with early onset AD

# ALZHEIMER'S DISEASE: CLINICAL MANIFESTATIONS

- Progressive, cortical dementia
- Diagnosis of exclusion
- Serial evaluations are needed
- Onset typically associated with advanced age
- Life span typically 8-10 years after symptom onset

# ALZHEIMER'S DISEASE: HALLMARK SYMPTOMS AND TYPICAL COURSE

- Aging in Reverse
- Memory deficits hallmark symptom from onset
- Medical/Behavioral Criteria initially
  - Episodic memory deficits d/t deficits with working memory and attention
  - Anomia
  - Difficulty understanding new and complex concepts
  - Possible anxiety and depression d/t awareness of errors
- Medical/Behavioral Criteria middle stages
  - Memory difficulties worsen, semantic memory becomes affected
  - Behavioral issues most pronounced
  - Disorientation for situation (time and place) and circumstance
  - Need assistance with ADL
- Medical/Behavioral Criteria late stages
  - Disorientated to self, situation, and circumstance
  - Incontinent of bowel and bladder
  - Possible agitation, delusion, dysphagia (80% in late stages)
  - Unable to walk, verbally communicate, recognize caregivers

# MULTI-INFARCT/VASCULAR DEMENTIA: NEUROPATHOLOGIES

- Damaged areas correspond to infarcts
- Usually history of hypertension or related vascular disease
- Possible neurological signs
  - Extensor plantar reflex
  - Pseudobulbar palsy with chewing/swallowing problems, slurred speech, emotional outbursts
  - Gait Abnormalities
  - Exaggerated deep tendon reflexes
  - Weakness of extremities

# MULTI-INFARCT/VASCULAR DEMENTIA: CLINICAL MANIFESTATIONS

- Decline in memory and two or more cognitive functions + Presence of cardiovascular disease documented by history, clinical examination, and/or brain imaging
- The presence of a relation between dementia and disease in the form or one or more of the following
  - Onset of dementia within 3 months following a recognized stroke
  - Abrupt deterioration in cognitive functions
  - Stepwise progression of cognitive functions related to vascular episodes
- Multi-Infarct Dementia most typical course with deficits seen as the cumulative effect of many small infarcts

# MULTI-INFARCT DEMENTIA: HALLMARK SYMPTOMS AND TYPICAL COURSE

- Often maintain personality and normal levels of emotional responsiveness until the later stages of the disease.
- Cognitive changes correlated to areas of damage
  - Typically more focal deficits noted as compared to global deficits with AD
- Typical Symptoms
  - Problems with thinking, language, bladder control, and walking
  - Cortical infarcts: aphasia, amnesia and visuospatial problems
  - Subcortical infarcts: produce psychomotor retardation, memory disorders, and cognitive impairment. Personality is retained and depression is common.

# FRONTOTEMPORAL DEMENTIA: NEUROPATHOLOGIES

- Frontotemporal dementia subtypes
  - FTD with motor disease
  - Pick's Disease
  - Semantic dementia
  - Primary Progressive aphasia
- Hallmark indicator: abnormal, swollen brain cells in the frontal and temporal lobes of the brain
- Brain atrophy In localized area of brain
  - Differential Dx with AD: AD more diffuse damage
  - Differential Dx with AD: Abnormal protein deposits in the nerve cells of the frontal cortex as differentiated from plaques and tangles associated with AD
- Does exist as an inherited disease in some families (not the majority)

# FRONTOTEMPORAL DEMENTIA: CLINICAL MANIFESTATIONS

- Onset 40-60 years of age
- May be confused with schizophrenia, depression, or other psychiatric disorders
- Rate of progression cannot be altered
  - Life span: 2 years to over 10 years after onset of disease
  - Death typically results from infection

# FRONTOTEMPORAL DEMENTIA: HALLMARK SYMPTOMS AND TYPICAL COURSE

- Personality change and lack of insight into one's own condition with intact memory
- Mentally inflexible: may appear selfish, aggressive
- Failure to recognize faces, and occasionally, some may use objects inappropriately
- Repetitive, meaningless behavior/compulsive behavior
- Childlike behavior
- Overeating with obsessive cravings
- Excessive alcohol intake may occur
- Oral obsessiveness with placement of objects in mouth
- Attention deficits
  - Difficulty maintaining conversation
  - Difficulty sustaining a line of thought
- Sexual aggression secondary to frontal lobe changes

# CURRENT TREATMENT TECHNIQUES:

# ASHA COMPENDIUMS

# GENERAL RESEARCH CONSIDERATIONS

- Reliability of differential Dx
- Majority of research specifically with Alzheimer's disease or unspecified dementia types
- Treatment focus often on maintenance, not improvement
- Each patient's symptoms are very individualized which can impact validity and  generalization of treatment results
- Lack of randomized controlled trials

# ASHA EVIDENCE-BASED PRACTICE COMPENDIUMS

- Supported Conversations
- Caregiver Training
- Simulated Presence Therapy
- Direct Cognitive Training
- Reminisce Therapy
- Reality Orientation
- Montessori Programming
- Spaced Retrieval

# SUPPORTED CONVERSATIONS

- **Zientz, J., Rackley, A., et al. (2007)**
- 6 studies reviewed
- Results
  - Family caregivers and nursing assistants appropriate groups to be trained
  - Education programs should:
    - Include education about AD, its impact on communication, and verbal and nonverbal communication strategies
    - Include opportunity to practice strategies with direct feedback
    - Provide individual sessions/ conferences to discuss concerns
  - Expected outcomes include:
    - For caregivers: increased knowledge of AD and communication problems, increased knowledge and use of communication strategies, and increased communication satisfaction with individuals with AD.
    - For individuals with AD: may have modest effects on depressive symptoms, irritability, and aggression and may also have positive effects on the amount or type of communication.

# CLINICAL IMPLICATIONS

- May have modest effects on depressive symptoms, irritability, and aggression that may be noted among all three types of dementia
- May have positive effects on the amount or type of communication
- Caregiver strain considerations

# CAREGIVER TRAINING

- **Thompson, C. A., Spilsbury, K., et al. (2007)**
- 44 randomized control trials evaluated
- Results
  - Statistically significant evidence that group-based supportive interventions impact positively on psychological morbidity
  - No evidence for the effectiveness of any other form of intervention in the range of physical and psychological health outcomes
  - Little evidence exists to prove that interventions aimed at supporting and/or providing information to caregivers of patients with dementia are uniformly effective

# CLINICAL IMPLICATIONS

- Outcomes highly dependent on specific issues the caregiver is facing and focus of training.
  - Communication strategy training may be more effective for a caregiver of a person with AD versus FTD

# SIMULATED PRESENCE THERAPY

- **Bayles, K. A., Kim, E., et al. (2006)**
- Method
  - 8 studies evaluated
- Results
  - SPT in SNF could be an effective technique for stimulating conversations with AD patients
  - Authors recommend that future research be conducted in this field with SLPs
    - SLP would facilitate and monitor SPT use in SNF
    - SLP would conduct tests of verbal episodic memory and consult with caregivers about how to convey positive content and vocal tone

# CLINICAL IMPLICATIONS

- Across the board, may help decrease episodes of resistance  to care by less familiar caregivers.  Behaviors noted to improve were taking medication and feeding (O'Conner, Smith, et al., 2011).

- Logistical concerns: technology, availability of recordings

- Doesn't help primary caregiver with resistance to care

# DIRECT COGNITIVE TRAINING

- **Zientz, J., Rackley, A., et al. (2007)**
- Method
  - 3 articles evaluated
- Results
  - Results showed benefits for both individuals with mild to moderate AD and their caregivers
  - Limitations: small sample sizes, selection bias, and time spent working with the caregivers and individuals with AD

# DIRECT COGNITIVE TRAINING

- **Clare, L., Woods, R. T. (2004)**
- Method
  - Comprehensive literature review investigating cognitive stimulation/reality orientation, cognitive training, and cognitive rehabilitation
- Results
  - Evidence did not provide strong support for the use of cognitive training interventions for people with early-stage AD
  - Methodological limitations: lack of randomized controlled trials
  - Not possible to draw firm conclusions about the efficacy of individualized cognitive rehabilitation interventions for people with early-stage dementia
  - Indications from single-case designs and small group studies are cautiously positive

# CLINICAL IMPLICATIONS

- Not strongly supported by research findings
- If positive outcomes occur, how long will they last based on progressive nature of most dementias?
- Will cognitive training lead to more behavior problems in FTD d/t patient not having insight into own disorder?
- What specific cognitive areas should be targeted?
  - Hierarchy of cognition: attention, memory, processing, problem-solving, executive function

# REMINISCENCE THERAPY

- **Kim, E. S., Cleary, S.J., et al. (2006)**
- 6 articles reviewed
- Results
  - Those with episodic memory impairments, with some ability to engage in verbal communication, may benefit
  - Those with mild to moderate dementia, with the ability to tolerate social interaction within a group without excessive disruption to other group members, may benefit
  - RT groups should be comprised of individuals at a similar level of cognitive-linguistic ability

# CLINICAL IMPLICATIONS

- Not appropriate for those with advanced dementia or those with behavioral disturbances
- Logistical concerns:  group settings of those with similar levels of function
- Facilitator needs to be familiar with participants' backgrounds
- Overall, popular activity among paid caregivers

# REALITY ORIENTATION

- **O'Connell, B., Gardner, A., et al. (2007)**
- Method
  - Comprehensive literature review
  - Clinical usefulness defined as something that could potentially improve patient well-being and/or organizational efficiency
  - Feasibility determined to be something that could be implemented in an acute care setting
- Results:
  - Reality orientation has been shown to improve and sometimes maintain the cognitive and behavioral function of people with dementia in LTC facilities and may have the potential to do the same in acute care settings

# CLINICAL IMPLICATIONS

- Will reality orientation continue to be effective in middle and advanced stages of dementia?
- EBP—Experienced Based Practice– sometimes reality orientation can agitate and lead to increased behaviors such as repetitive questions and aggressiveness

# MONTESSORI PROGRAMMING

- **Mahendra, N., Hopper, T., et al. (2006)**
- 5 articles reviewed and evaluated
- Results
  - Candidates for treatment:
    - Those with episodic memory impairments who have some capacity for motor learning, communication, socializing, and no history of physical aggression
    - Those with mild-moderate dementia with ability to attend/participate during activities
  - Before implementing a Montessori-based intervention:
    - Screen for visual, auditory impairments, sensory integration, and motor impairments
    - Observe Individual socializing/participating in group activities with other residents
  - Treatment tasks should be relevant to the individual's daily life
  - Document generalization to ADLs

# CLINICAL IMPLICATIONS

- Can be used individually and in group settings with varying levels of function
- SLP must identify level of function and appropriate adaptations and educate caregivers before implementing

# SPACED RETRIEVAL

- **Hopper, T., Mahendra, N., et al. (2005)**
- 15 studies reviewed and evaluated
- Results
  - Results were very positive
  - Methodological shortcomings warrant cautious interpretation of the studies
  - Appropriate candidates are those with declarative memory impairments with mild to severe cognitive deficits and the ability to engage in structured tasks
  - Training sessions should be administered weekly or more frequently as needed
  - Verbal responses and skills taught should be individualized based on client needs

# CLINICAL IMPLICATIONS

- Applicable to varying levels of function

- Treatment must be consistent and frequent

- Must be highly individualized to increase effectiveness

# APPLIED BEHAVIOR ANALYSIS

# THE SEVEN DIMENSIONS OF ABA

- **Applied**:  focuses on areas of social significance
- **Behavioral**:  target is for actual behavior to change
- **Analytic**: the behavior analyst can control the behavior that is being changed by changing the control behavior
- **Technological**:  all researchers should be able to "replicate the application with the same results"
- **Conceptually systematic**:  applications utilized and analyzed based on principles of ABA
- **Effective**:  the application must actually change the behavior
- **Generality**:  applications should generalize to other environments and behaviors and sustain over time

Baer, D.M., Wolf, M.M., Risley, T.R. (1968)

# BASIC CONCEPTS: CLASSICAL CONDITIONING

- Classical/Respondent Conditioning
  - People respond in predictable ways to certain stimuli.
  - The response to a stimulus is called the respondent behavior—a behavior which is elicited by antecedent stimuli.
  - Respondent conditioning is learning in which new stimuli are conditioned to elicit reflexive responses through stimulus–stimulus pairing
  - Example: Pavlov conditioning a dog to salivate at the sound of a bell by systematically pairing food presentation with bell ringing

# BASIC CONCEPTS: OPERANT CONDITIONING

- Operant Conditioning
  - Operant behavior is a behavior selected by its consequences
  - Conditioning is the result of reinforcement and punishment.
  - The person "operates" in his/her environment to produce some type of desirable result.
  - Example: person working hard at work is reinforced (positive) with a pay raise which results in more hard work
  - Example:  a child crying for candy in the checkout line is reinforced (negative) by getting candy which results in same behavior next time in checkout line
- Reinforcement: Encourages behavior
- Punishment: Discourages behavior

# ABA APPLICATIONS IN OTHER CLINICAL POPULATIONS

- Autism Spectrum Disorders
- Traumatic Brain Injury

# ABA APPLICATIONS IN AUTISM

- **Levy, S., Kim, A. H., et al. (2006)**
- Method
  - Evaluated 24 studies conducted with young children with autism
  - The aspects of the interventions were divided into six categories:
    - 1. parent involvement, 2. intensive behavioral intervention, 3. multi-component intervention, 4. language/speech treatment, 5. setting, and 6. other interventions.
- Results
- Features with positive effects were: parent involvement, intensive behavioral intervention, multicomponent early intervention, language/speech treatment, imitative interaction procedure, and duration of the intervention.
- 3 consistent characteristics showed positive effects on the treatment of autism in young children: (a) interventions that focused on a variety of areas including language, behavior management, social skills, and so forth; (b) interventions that were intensive and lasted for a long time; and (c) interventions that involved the children's parents.

# ABA APPLICATIONS IN TBI

- **Ylvisaker, M., Turkstra, L., et al. (2007)**
- Method
  - 65 studies reviewed
  - 3 general categories
    - Traditional contingency management
      - Positive reinforcement, negative reinforcement, punishment
    - Positive behavior interventions and supports
      - Environment, errorless learning, positive daily routines, engagement
    - Combined
- Results
  - General behavioral interventions can be considered a treatment guideline for children and adults with behavior disorders after TBI
  - Traditional contingency management and positive behavior support procedures can be said to be evidence-based treatments
  - Variety of methodological concerns with studies

# SUCCESSFUL DEMENTIA TREATMENT APPROACHES EMPLOYING ABA CONCEPTS

- Montessori Programming (Mahendra, Hopper, et al., 2006)
  - When tasks are tailored to an individual's level of function, increased participation will be reinforced via person's feeling of success thus increased participation should be generalized

- Spaced Retrieval  (Brush & Camp, 1998; Camp, 1999; Camp, Bird & Cherry, 2000)
  - Systematic pairing of verbal information/strategy with motor response

# RELATIONSHIP OF BEHAVIORS TO COMMUNICATION ENVIRONMENT

- Communication Environment as defined by Brush, Sanford, et al., 2011
  - Communication Partners
  - Cognitive Aspects
  - Visual Aspects
  - Auditory Aspects

# BEHAVIORS RELATED TO COGNITIVE-COMMUNICATIVE BREAKDOWNS

- Disruptive, inappropriate, and aggressive behaviors in patients with dementia can often be linked to breakdowns in communication.
    - Example: A person throwing food items because they are unable to verbally communicate that they don't like it
    - Example: A person urinating in a public area because they are verbally unable to communicate the need to use the bathroom and are cognitively unable to locate it on their own.
    - Example: A person repeatedly asking where her husband is because she can't remember that she is in a nursing home
    - Example:  A person resisting care because he doesn't recognize the caregiver and is unable to communicate his fear/anxiety

# APPLIED BEHAVIOR ANALYSIS AS A TREATMENT FRAMEWORK

# EXISTING RESEARCH

- **Findings from Sung & Chang (2005)**
  - Preferred music intervention demonstrated positive outcomes in reducing the occurrence of some types of agitated behaviors in older people with dementia
  - It also suggests that preferred music intervention could be a viable alternative to chemical and physical restraints for managing behavioral symptoms of dementia

# EXISTING RESEARCH

- **Findings from Buchanan (2006):**
  - Medical intervention often leads to a plethora of new issues for patients with dementia due to
    - The unwanted side effects associated with the medications,
    - Adverse interactions of medications in patients with polypharmacy
    - The effectiveness of the disorder brain in metabolizing medications.
  - Negative Behaviors Targeted: Depression, Wandering, Disruptive Vocalizations, Decreased Socialization, and Inappropriate Sexual Activity

# GOALS OF BEHAVIOR TREATMENTS IN DEMENTIA

- Help patients maintain highest level of function possible for as long as possible

- Decrease or prevent inappropriate behaviors

*Adapted from Buchanan (2006)*

# INITIATING BEHAVIOR TREATMENTS

- Must be able to identify behavior triggers and behavior consequences
- Think in terms of cognitive-communicative breakdowns as behavior triggers

# PROCEDURES FOR BEHAVIORAL INTERVENTION IN DEMENTIA

- Graduated prompting
- Reinforcement
  - Errorless Learning
  - Contingency Training
  - Noncontingent (time-based schedule)
- Environmental modifications/adaptations

# ABA: PROMPTS/CUES

- Spaced Retrieval
  - Utilizes more intact procedural memory with stimulus-response approach
  - Decreased prompts with increased duration of learning

- Pair visual and verbal prompts
- Signs
- Color-coding/signals to denote specific environments
- Clocks/calendars

# ABA: REINFORCEMENT

- Learning is increased if stimulus if paired with reinforcement
- Errorless learning
  - Do not want to reinforce error responses
- Contingency Training
  - Pair arrows with verbal cues with rewarding activity to help increase environmental orientation

# ABA: ENVIRONMENT

- Cognitive
  - Cues
  - Personalized spaces and materials
- Visual Aspects
  - Lighting
  - Visual organization
  - Maximize sightlines
  - Contrast
  - Glare
- Auditory Aspects
  - Background noise
  - Reverberation

*Environmental and Communication Assessment Toolkit (ECAT), Brush et al., 2012*

# ABA TREATMENT APPLICATIONS: WANDERING AND EXIT-SEEKING

- Most prevalent in AD
- Result of a breakdown of stimulus control or ability to integrate environmental information to make appropriate goal-directed decisions
- Environmental/verbal cues pairings with tangible reinforcement for desirable outcome:  color-coded arrows, grid patterns, aversive stimuli in dangerous areas, visual barriers, etc.

# ABA TREATMENT APPLICATIONS: INAPPROPRIATE SEXUAL BEHAVIORS

- Most prevalent in FTD
- Result of a breakdown of stimulus control– the behavior is not necessarily inappropriate but the environment/timing is
- When behavior noted in inappropriate setting, provide verbal/physical redirection, color-code/pattern appropriate environment for behavior, pair redirection with environmental discrimination

# ABA TREATMENT APPLICATIONS: DEPRESSION

- More typical in AD and VaD
- Depression is the result of decreased access to pleasant events
- Increase access to pleasant events via reinforcement, prompts, and environmental modifications

# ABA TREATMENT APPLICATIONS: AGGRESSIVE BEHAVIORS

- Middle-stage AD, VaD, FTD
- Reinforcement positive behaviors during ADLs
- Environmental modifications:  preferred music and preferred stimulus items

# ABA TREATMENT APPLICATIONS: AGITATION

- AD, VaD, FTD
- May include aggression, pacing, disruptive vocalizations
- Differential reinforcement:  ignore disruptive vocalizations while reinforcing positive behaviors
- Noncontingent reinforcement: when patient asks repetitive questions, caregivers provide answer/assurance on set time-schedule not as a response to the question

# ABA TREATMENT APPLICATIONS: FEEDING PROBLEMS

- AD, VaD, FTD
- Inability to feed self, disruptive mealtime behaviors, food refusal, eating inappropriate objects
- Always rule out medical etiologies for problems before addressing issues using ABA approach
- Increased visual/verbal prompts and reinforcement
- Environmental modifications:  increased length of meal, more supported-autonomy in food selection, family style dining
- Differential reinforcement to decrease inappropriate eating behaviors.

# ABA TREATMENT APPLICATIONS: INCONTINENCE

- AD, VaD, FTD
- Always rule out medical etiologies before using ABA approach
- Prompting Voiding schedule with use of verbal prompts, physical redirection, environmental modifications appropriate for cognitive function, reinforcing dryness, feedback when wetness occurs (social disapproval as negative reinforcement/reminders to ask for help)

# ABA TREATMENT APPLICATIONS: INCREASED SOCIALIZATION AND PARTICIPATION

- AD, VaD, FTD
- Verbal reinforcement/praise for participation
- Tangible reinforcement such as cookies for participation
- Environmental modifications to promote socialization
- Montessori Programming

# ABA TREATMENT APPLICATIONS: INCREASED INDEPENDENCE DURING ACTIVITIES OF DAILY LIVING

- AD, VaD, FTD
- Caregiver training to use visual/verbal prompts
- Environmental modifications paired with cues and reinforcement
- Modeling and reinforced practice for tasks such as dressing

# QUESTIONS?
# CLINICAL CASES?

# Thank You!

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