Implications of Skinner's Verbal Behavior for Studying Dementia\\

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Abstract

Persons with dementia experience continual declines in a number of abilities. Language abilities are particularly hard hit and become increasingly impaired as the underlying disease progresses. These language impairments make verbal communication very challenging for family and professional caregivers. As a result, caregivers may inadvertently punish verbal behavior, thereby exacerbating the deterioration of verbal repertoires. Although the topography of language impairments associated with dementia have been well described, less empirical work has been conducted concerning how to minimize these impairments and their deleterious effects. In 1957 B.F. Skinner outlined his conceptualization of language and cognition in his book *Verbal Behavior*. This paper will explore the implications of Skinner's *Verbal Behavior* for studying communication impairments associated with dementia.
Keywords: elderly; dementia; verbal behavior; communication

Overview of Dementia

"Dementia" is a generic term that describes the progressive decline in a number of cognitive abilities such as attention, memory, language, perception, and reasoning that interferes with daily functioning (APA, 2000). Dementia can also result in behavioral changes such as wandering or aggression, declines in self-care skills, and mood disturbances such as depression or anxiety. Dementia can be caused by a number of different, irreversible causes (e.g., Alzheimer's disease, vascular disease, Pick's disease) as well as reversible causes (e.g., vitamin B12 deficiency, medication overdose). Dementia is a serious public health concern in the United States. If one considers all causes of dementia, approximately 6-10% of individuals over the age of 65 suffer from dementia, with Alzheimer's Disease (AD) accounting for approximately 65% of all cases (Hendrie, 1997). Age is the number one risk factor for developing dementia, which is particularly concerning given the rapidly aging population of the United States. It is projected that 13 to 15 million Americans could suffer from AD alone by the year 2050 if no cure is found (Hebert, Scherr, Bienias, Bennet, & Evans, 2003).

Language deficits associated with dementia. Language deficits (i.e., aphasia) associated with dementia can take on various forms/topographies, including receptive and expressive language deficits. Language deficits in the early stages of dementia are characterized by pronounced difficulties with speech production as opposed to comprehension (Levine, 2006). Common early stage deficits include word finding deficits (i.e., anomia), poor spontaneous writing, indefinite references ("it", "those", or "thing"), repetition of words or ideas, and difficulty understanding complex language such as metaphors or analogies (APA, 2000; Kempler, 1991; Orange, 2001). As the disease progresses deficits such as empty content, inappropriate word substitutions, difficulties following multi-step commands, poor topic maintenance and inappropriate topic shifts, reduced reading comprehension, frequent digression from conversational topics, reduced verbal fluency, difficulties with turn-taking and producing fewer utterances per conversational turn (APA, 2000; Kempler, 1991; Orange, 2001; Levine, 2006) become apparent. In the final stages of the disease, the patient may engage in echolalia, produce continuous streams of nonsensical language, or become mute (Orange, 2001). These language deficits have important everyday implications for patients, and caregivers, who have described communication deficits as one aspect of dementia with which it is particularly challenging to cope (Orange, 1991). The many implications of language deficits associated with dementia will be further described in the sections below.

Skinner's Conceptualization of Verbal Behavior and Its Implications for Dementia

Skinner (1957) distinguished and functionally defined 6 types of verbal behavior including the tact, mand, echoic, textual, intraverbal and autoclitic. To say that these are defined functionally means the categories are delineated according to the reinforcement relations that shaped and/or maintain them as operant responses, not according to any topographical property of the word(s). For example, the word "water" could be an example of any of the categories, depending upon the conditions that evoke the response. Shouting "Water!" whenever a river or lake is visible is a tact whereas the same, "Water!" emitted after an hour in warm sun, even if perfectly similar in tone, inflection, or all formal properties, is a mand, for it is controlled very differently, and has a much different ultimate function.

With this critically important difference between the Skinnerian versus traditional analyses (that of grammarians, for example) in mind, the 6 categories are defined in the following sections along with a discussion of a seventh variable – the audience. The sections below will cover the following information: 1) a short overview and definition of each verbal operant. 2) Examples that illustrate how each verbal operant may be relevant in the context of dementia, with a particular emphasis on the potential negative implications of a breakdown in verbal functioning. Examples involving both higher and lower functioning patients will be provided to emphasize that individuals with dementia vary in their degree of functional impairment and challenges experienced by patients and caregivers differ at different points in the disease process. 3) When available, examples of empirical literature relevant to the particular verbal operant will be presented. The discussion of empirical literature is not meant to be exhaustive, but illustrative of the work that has been done examining verbal behavior in persons with dementia.

Tact

Tacts (verbal behavior that *contacts* the environment) occur under the control of a (usually nonverbal) antecedent stimulus. The discriminative stimulus that controls a given tact might be an event ("It is lunchtime"), an object ("Hamburgers are on the menu"), or a property of either ("My hamburger is too rare"). Tacting is frequently likened to the conventional term "informing," (Baum, 2005) but Skinner (1957) is careful to point out 2 things: First, a given tact is simply a bit of verbal behavior made more likely by the presence of a certain stimulus (1957, p. 82). In other words, the antecedents controlling it must drive our analysis, not any idea about the "meaning" of what is said. Second, as a functional class of verbal behavior, tacting encompasses a diversity of forms, including announcing, proclaiming, stating and naming (1957, p. 186). The control of tacting by prior stimuli is the essential property to grasp. For example, the third author is always amused when his elderly grandparents visit him in a new city. They spend their entire time on any car ride emitting tacts evoked by commonplace stimuli (e.g. "There's a hamburger restaurant just down the street!"). Presumably, the novel setting for the "golden arches" evokes the tact. No such effect would be seen in a longtime resident, and a person familiar with the community even ends up hard-pressed to reinforce such tacts.

Dementia clearly impairs tacting throughout the disease process. For example, in the early stages of dementia, even familiar objects (e.g., family members, friends, utensils, animals) inadequately control tacting. This is often referred to as "anomia", or the inability to name objects or people accurately. As the disease progresses, the individual has particular difficulty tacting private stimuli such as the urge to use the restroom, thirst, pain, or aversive emotional states such as fear or anger. The negative effects of impaired tacting are evident. For example, forgetting a grandchild's name can be very upsetting for the child as well as the patient. Another common example in long-term care facilities involves the inability to tact physical pain. Patients may engage in "disruptive behaviors" such as loud moaning or physical aggression when they cannot say "I'm in pain" or "that hurts." Prolonged suffering, loss of dignity, and inadequate care are but a few consequences of this breakdown in the ability to tact.

Few empirical studies have attempted to improve tacting in dementia patients, but some intriguing findings exist. For example, Cameron Camp and his colleagues have investigated the effectiveness of a procedure called spaced retrieval (SR) to improve tacting in persons with dementia. SR is a shaping paradigm that involves giving a person practice at successfully recalling information over successively longer time periods (Camp, 1998). SR has been found to assist dementia patients in learning the names of people (Camp & Schaller, 1989) and objects (Abrahams & Camp, 1993). SR appears to represent a simple, portable, and teachable intervention that can reestablish the ability to name specific objects or people over relatively long periods of time (e.g., a week or more) in persons with mild to moderate dementia.

Another line of empirical work designed to improve tacting involves the use of memory books that consist of a series of bound pages with a picture, and sometimes a description, of a person, place, or symbol that is meaningful to the patient. Bourgeois and her colleagues (1992, 1993; Hoerster, Hickey, & Bourgeois, 2001) investigated the effects of an external communication aid called personalized memory books for improving communication between dementia patients and caregivers. These studies have demonstrated positive outcomes in terms of tacting including more novel, detailed, and factual statements during conversations and more on-topic verbalizations. Additional benefits include better turn-taking; reductions in negative caregiver interactions; caregivers asking fewer questions; and conversation that is more focused on the patient (Hoerster, et al.).

Mand

Mands (as in "*demand*" or "*command*") are verbal operants whose likelihood of occurrence and form are controlled by: 1) a given state of deprivation or aversive stimulation and; 2) a specific type of reinforcement (Pear, 2001; Skinner, 1957). Unlike tacting, manding has no particular relation to an antecedent stimulus. Mands such as "Please turn on the light," typically produce a reinforcer (the listener turns on a light) appropriate to the state of deprivation or aversive stimulation (e.g., perhaps the speaker cannot see to read). Most mands specify the appropriate reinforcer (Baum, 2005) and many specify the behavior of the listener as in the preceding example. The speaker then often provides generalized conditioned reinforcement of the listener's behavior, such as praise, or a "thank you."

Like tacting, manding occurs in a diversity of forms such as requests for assistance, gesturing or advice given to others. For example, a nursing home resident who cannot hear the dayroom T.V. might mand "Could you please turn up the volume?" a behavior reinforced by the health care aide (the listener) adjusting the sound. As the ability to mand in a precise manner deteriorates as the disease progresses, difficulties between caretakers and patients commonly occur. For instance, the first author witnessed a situation where a patient rolled his wheelchair to the nurse's station and began moaning and pointing to his foot. The nursing assistant, confused by the patient's behavior, sternly asked him to quiet down. The patient subsequently began moaning and yelling louder while continuing to point at his foot. As the situation escalated, a more experienced nursing assistant came by, moved the patient's foot onto the footrest of his wheelchair, and the patient consequently stopped moaning.

This incident represents a larger issue commonly encountered in long-term care facilities, namely that severely impaired patients may engage in "socially inappropriate" behavior (e.g., loud moaning) or vague gestures or verbalizations (e.g., pointing to one's foot, one-word utterances such as "foot" or "there") that function as imprecise mands. Staff that has little shared history with the patient consequently respond ineffectively (e.g., reprimand, speak louder, ask for clarification), which results in aversive interactions with staff as in the example above. For those patients with more severe language impairments, external aids such as picture books may help supplement mands in that individuals can also point to pictures of desired objects, activities, or people. In the example above, a simple picture of a foot sitting on a footrest (along with other pictures of commonly desired objects) was attached to the patient's wheelchair and resulted in reduced staff-patient conflicts.

Echoic

Echoic responses are controlled by specific auditory stimuli, and feature a"point-to-point physical similarity" with that stimulus (Pear, 2001, p. 377). Echoics are likely the earliest verbal response to be learned (e.g. an infant's "Mama!" is shaped from diffuse babbling to a perfect similarity to his or her mother's usage). Like tacts, echoics are shaped primarily through generalized conditioned reinforcement. For example, a new nursing home resident might emit the echoic "319," when told "Your room number is 319" and be reinforced with "That's correct!"

Two points regarding echoics that are possibly important for the subject of this paper. First, echoics are useful in building tacts and mands (Pear, 2001), although it is unclear if this is possible in individuals with dementia. Henry and Horne (2000) have demonstrated that contingent reinforcement can strengthen echoic behavior in persons with severe dementia. Future research will be needed, however, to determine if rehabilitation efforts that involve strengthening echoic behavior in persons with dementia will provide the substrate for rebuilding more complex manding and tacting repertoires.

Second, echoics may be mistaken for tacts (that is, mistaken for "understanding" or misinterpreted as indicating high likelihood of compliance). For example, a family member might be preparing to leave her (early Alzheimer's) mother's home just as mom is finishing a cooking task. The daughter in this situation might mand "Mom, when you are done, remember to turn off the stove!" to which Mom replies "Turn off the stove, right!" The daughter discovers the stovetop still hot the next morning. What has occurred here? We might hypothesize that "Mom's" response was not a tact. In such a situation, a verbally intact individual would likely respond to the daughter's mand with a chain of private tacts ("The stove is on," "This sauce will be done after 2 more minutes of stirring," and "I need to turn off the stove at that time.") and essentially reinforce the mand with an autoclitic describing the likely strength of the appropriate response (see Skinner, 1957, p. 315) indicating "Yes, I will definitely turn off the stove." The mother in this example seemed to respond appropriately, but in reality simply responded with an echoic ("turn off the stove") and, almost reflexively, added a socially appropriate intraverbal (discussed below), the "right!" that ended her sentence. Thus, what the daughter believes to be mom's "strong intention" to safely extinguish the stove is nothing more than the confluence of two well-trained verbal operants (repeating what we are told, and doing so politely) divorced from any connection to what should be easily tacted as the dangerous stimulus in the environment. The example above shows how the ability to engage in echoic behavior can actually cause communication problems between caregivers and patients, particularly with professional caregivers who have little to no shared history with the patient. These communication problems are at best frustrating and at worst dangerous. Unfortunately, confusing echoics with other verbal operants is particularly likely given that the ability to engage in echoic responses is intact late into the dementing process.

In the case described above, Skinner's analysis might be useful for enhancing the safety and independence of the patient. It would suggest, for example that the daughter could gain greater control over her mother's behavior by amplifying her vocal mand. She could, for example, post on the stove a written mand: "MOM, TURN OFF THE STOVE," perhaps even including a photo of herself looking concerned and pointing toward the relevant control. Or she could devise some way that a heated burner might more effectively control the mother's tact ("Oh, my, the stove is on") and/or nonverbal behavior (actually turning it off). Stoves often provide only a weak S^D to occasion turning off a burner, thus the impaired user might be assisted by using a larger light or an alarm sound.

Intraverbal

Intraverbal responses are evoked by prior verbal stimuli, much as tacts are evoked by environmental antecedents (Pear, 2001). Unlike echoic responses, intraverbals have no formal correspondence with the evoking stimulus. But like both echoics and textuals, intraverbals are maintained via generalized conditioned reinforcement. Thus, the stimulus and response may be either vocal or written, or any combination and the analysis remains the same. A simple example of what Skinner (1957, pp. 71-72) refers to as "trivial" intraverbals, are the "answers" evoked by common social "questions" such as the intraverbal response "I am fine," in response to the vocal verbal stimulus "How are you today?" Persons with dementia typically maintain the ability to respond appropriately to these common social questions (it is often said that patients maintain "social graces") in the early stages of the disease, making early detection a difficult task, even for those who know the patient well.

However, intraverbal is not necessarily to be equated with trivial, and Skinner goes on to note many situations in which complex conversations or answers (e.g. "the facts of science" p. 72) are mainly intraverbally controlled. Lack of such control can even have diagnostic importance, such as when we ask a mental status exam question such as "Complete this sentence, 'Right as _____'." We might assess further if we receive the wrong answer from a patient whose response ("rain") should have been well established intraverbally through years of training within our particular verbal community.

Textual

Textual (as in reading a text) responses are vocal responses controlled by non-auditory stimuli. These S^Ds may be visual or tactile (i.e. Braille) stimuli and may have a diversity of forms (e.g. words, pictures, symbols). But all simply set the occasion for a vocal response. Like echoic behavior, much of a texting repertoire is explicitly evoked and reinforced, with generalized conditioned reinforcers, in "educational" settings (school) or relationships (parent-child). Here the listener reinforces the speaker's vocal responses if they have the correct relationship to the textual stimulus.

Fortunately the ability to engage in textual responses remains intact early in the dementing process (Orange, 2001), thus behavior may be controlled by more complex stimuli such as lists, calendars, or notes produced by others or themselves. Therefore, analyzing textual control, and making practical use of textual stimuli in populations such as patients with dementia is relevant and useful. This is illustrated above with our "turn off the stove" example. Bourgeois and colleagues (1997) demonstrated that repetitive questions could be reduced in community-dwelling persons with dementia by having family members prompt patients to read cards that contained the answers to frequently asked questions.

Even as the underlying disease progresses into the moderate stages, patients can respond effectively to simple, frequently-occurring words (Cummings, Houlihan, & Hill 1986) or pictures depicting objects or actions. The first author worked with a family in which the father with dementia left his dirty clothes on the bathroom floor. A large sign on the top of the hamper reading, "PUT CLOTHES HERE" resulted in near elimination of this behavior. Hussian (1988) showed how stimulus enhancement techniques such as making words or pictures larger, more colorful, or in prominent, noticeable places may be particularly helpful in reducing challenging behavior in persons with dementia that is due to insufficient stimulus control such as attempting to leave protective environments or inappropriate voiding. Whether textual (written by others) or self-textual (e.g. a reminder note to one's self) the influence of written or pictorial S^Ds may long outlast similar echoic stimuli, and thus control behavior more effectively. And, as Skinner further notes, the massive reinforcement history for responses such as reading makes it likely that textual stimuli will attract attention.

Autoclitic

Autoclitic are verbal responses controlled by the speaker's own previous verbal behavior. They allow the speaker to create longer pieces of verbal behavior that are "intelligible," that is, that function to allow the listener to take "effective action" (Skinner, 1957, p. 314). Pear (2001) interestingly describes

autoclitics in a manner useful for the topic of the current paper. He casts them as verbal escape or avoidance responses that are reinforced by modifications in the listener's response. An extension of Pear's (2001, p. 377) pediatric example may illustrate. A geriatric patient might mand "Please give me my medication," but then quickly add the autoclitic "the blue tablets," to ensure that the listener does not dose him with the white tablets and blue capsules he has recently taken. The autoclitic phrase is here controlled by the deficient mand, and will be negatively reinforced by avoidance of the overdose that the listener might otherwise have supplied.

The Audience Relation and the Negative Audience

As language deficits become evident, there will be at first an insidious effort to alter how one interacts with that person. Although some small adjustments might be helpful in facilitating communication (i.e., slowing down, using fewer words to communicate), many other adjustments (e.g., corrections and criticisms, or ignoring the individual) may actually serve to punish verbal behavior. These 'tell-tale' signs of change in communication patterns coincide with what Skinner termed the "Negative Audience" which is, "an audience in the presence of which verbal behavior is punished" (Skinner, 1957 p. 178).

Changes in interactions with the verbal community alter patterns of reinforcement with very established histories. The impact of these contingencies on communication and their relative strength is established over a lifetime, and do not simply emerge as relevant when dementia begins to erode these established communication patterns. We start out our lives with our parents celebrating every word we utter. Later on, adolescence presents a rich tapestry of communication opportunities with the adolescent needing to effectively communicate with everyone from the very young (e.g., nieces and nephews) to the very old (e.g., grandparents) (Williams & Garrett, 2002).

With age comes a narrowing of the channels of communication with a cohort that grows progressively smaller over time through attrition. Unfortunately, with the dwindling of an audience there also comes the potential for a concurrent decline in verbal behavior. Also, fewer opportunities for meaningful communication concomitantly increase the meaning of social opportunities and the reinforcement they provide (see Houlihan, Rodriguez, Levine, & Kloeckl, 1990). In fact, results of the Geriatric Reinforcer Survey (Houlihan et al.) show that what elderly residents of nursing homes find most rewarding is social contact and conversation with family and friends.

Despite this need for socialization, many changes in the verbal community actually produce reductions in social interaction. Initially, the remaining audience is one often made up of family and friends that are most familiar to the dementia sufferer. These individuals may no longer reinforce verbalizations with smiles and head nods, but instead replace them with looks of concern, frustration or disinterest (Skinner, 1957). These audiences may effectively punish verbal behaviors in the sense of socially conveying a visible preference for silence. Because recognition is a memory system that relies on information already established in memory to match or compare, it generally outlasts recall which involves a search of memory for something that is often more recently established. This is to say that people are generally better with faces than names. Izard has shown convincingly that facial expressions are our earliest and most established forms of expression and communication (Izard & Ackerman, 1997). Smiles, nods, and continuation of conversations serve as setting events for positive social behaviors. Looks of disinterest or statements like "I told you that already," or "I know you're not that stupid," serve to punish prosocial behaviors and negatively reinforce social withdrawal or dependence. The meaning of those expressions is amongst some of the last things lost to memory. People are sometimes even more callous or blunt with individuals with memory problems because they figure that they will just forget the negative statements anyway.

Although those familiar with the patient may initially serve as a negative audience in the manner described above, the situation often continues as impairment worsens and the patient requires placement

in long-term care facilities (e.g., nursing homes, assisted living facilities). In long-term care, the patient is being cared for by individuals who share no history with the patient and who are paid little, have little training, and have many patients to care for in a short amount of time. This combination of factors can understandably lead to poor staff-patient communication. For example, recent studies by Williams and colleagues (2009; Cunningham & Williams, 2007) have shown quite clearly that a disrupted pattern of communication known as elderspeak (i.e., infantilizing speech similar to that used with small children) exists in staff-patient relationships in nursing homes and that elderspeak increases the probability of resistance to care (e.g., hitting, saying no, crying) by dementia patients.

Kitwood (1990a) refers to these negative changes in patterns of communication as the "malignant social psychology." The result can be social withdrawal, which is understandable in that many of these patients have lengthy histories of being immersed in an environment that generally provided rich schedules of reinforcement (both positive and negative) for their spoken language. As Skinner (1957) has noted, a rich schedule of reinforcement is also a schedule that is most easily extinguished (Neisworth, 1985). Over time, the graduated banishment, first psychologically and eventually physically, of the dementia sufferer from the verbal community may occur and the end can be marked by a nearly total deprivation of sustaining human contact.

Overall, it appears that at a point in your life when you most crave and value human social contact, sources of social contact begin to diminish and the type and quality of communication changes. Even those fortunate enough to maintain their cognitive abilities into old age might find themselves on a schedule of extinction with few opportunities for discussion with others and their ideas often being devalued due to their age. The net result of diminished opportunities for social interaction, instances of elderspeak such as "let's go potty," combined with negative visible or verbal reactions to flawed statements, is to take our memory impaired loved ones away from us well before the disease does. Kitwood (1997) suggests that this malignant social psychology (i.e., negative audience) might "…even serve to accelerate the advance of neurological degeneration" (p. 51).

Some empirical work has focused on interventions targeting specific repertoires of the verbal community with the goal of improving communication with patients, reducing problematic behavior (e.g., resistance to care) and improving mand compliance. These studies demonstrate how important the verbal community is in contributing to the functioning of dementia patients as well as the importance of specifying behaviors of the verbal community that either increase or decrease the likelihood of evoking effective behavior from persons with cognitive impairment. For example, Gentry and Fisher (2007), using an ABAC design, compared two different types of listener repair responses on the verbal behavior of three dementia patients. Repairs were either direct (i.e., the listener provided corrective feedback to the patient when an error is made) or indirect (i.e., the listener restated his/her understanding of what the patient said). Results indicated that indirect repairs were associated with more words spoken, longer speech duration, fewer topic changes, and fewer incomplete interactions compared to direct repairs.

Recently studies have begun to investigate the relationship between patient mand compliance and the type of mands delivered by caregivers during personal care tasks (Buchanan, Christenson, & Houlihan, 2008). Preliminary results show that alpha commands (i.e., commands that are clear, concise, and feasible) produce significantly better mand compliance than do beta commands (i.e., commands that are vague, ambiguous, or do not give the individual an opportunity to comply). In addition, commands that involved one step, that were stated directly, that were repeated exactly, and that clarified previous commands were more effective in producing compliance. On the other hand commands in the form of questions, commands that involved more than one step, and commands using first-person plural pronouns ("we need to go to the bathroom") produced greater rates of noncompliance.

Practical Implications

An important practical implication of Skinner's functional analysis is that it provides a framework for conceptualizing intervention targets (e.g., tacting or manding repertoires) that could potentially help maintain independence, preserve dignity, and reduce burden on caregivers. The 7 verbal operants provide valuable a system for categorizing communication problems and, as many of the examples described throughout this paper illustrate, can even be prescriptive in the sense of suggesting intervention strategies. As an additional example, consider a familiar scenario that occurs in long-term care facilities where an individual with dementia is physically or verbally aggressive during activities of daily living (ADLs) such as bathing. Commonly a patient will begin by protesting to getting wet or having clothes taken off with either vague statement (saying "no" "why", or "stop") or seemingly benign behaviors (e.g., heavy sighing, tightening muscles, or pulling away from caregivers). These behaviors often function as mands that essentially communicate something like, "Please back away from me because I'm scared, in pain, cold, embarrassed, etc…" For various reasons (e.g., ADLs must be completed, the patient's mands may be imprecise or incomplete, the caregiver is attending to another caregiver and not the patient), these mands are often ignored by caregivers. Patients may respond by augmenting their mands with cursing, threatening, or hitting caregivers in order to escape or otherwise change the aversive situation. Caregivers may respond by altering their behavior in a variety of ways (e.g., provide a brief break, end the task, re-establish eye contact with the patient, talk directly to the patient as opposed to another caregiver, apologize, change the water temperature) that can serve to reinforce aggression. Ideally, a caregiver could reflect upon this situation and identify that a mand was overlooked early in the bathing process and consider other ways to approach bathing next time by, for example, proceeding more slowly, changing water temperature when asked, talking directly to the patient about familiar topics, or periodically giving the patient a break contingent upon more appropriate behavior. This approach is likely to be far more fruitful than simply labeling the patient as "aggressive" or "violent." At best these labels result in caregivers becoming resigned to the "fact" that the patient is, and always will be, aggressive and aversive interactions continue. At worst these labels result in placing the patient on psychotropic medications that often are ineffective and have harmful side effects such as sedation or confusion.

Future Research Implications

Skinner's analysis may also provide a useful guide for future research on communication difficulties in persons with dementia. Although the discussion above points to numerous areas for future empirical inquiry in our opinion, four particularly important targets for future research with dementia patients include: 1) Improving tacting. The inability to name objects or people is a prominent deficit early in the disease process and can be very distressing for patients and their families, particularly when the names of loved ones cannot be produced. 2) Improving manding. The ability to clearly express needs verbally is impaired throughout the disease process. Unsuccessful attempts to communicate needs can produce frustration and social withdrawal in both patients and their caregivers and leave the patient's needs unmet. Eventually, behavioral disturbances such as loud, repetitive vocalizations, pacing or physical aggression may develop as an alternative means for expressing needs. 3) Improving mand compliance. Although mand compliance is a listener repertoire, and thus not technically verbal behavior, Henry and Horne (2000) appropriately note that one must learn appropriate listener behavior in order to function as a member of the verbal community. Also, because individuals with advanced dementia require assistance to complete personal care such as dressing or bathing, mand compliance is critical for the successful completion of these tasks. Developing ways to improve mand compliance may result in less stressful interactions during personal cares and fewer injuries to caregivers and patients. 4) Altering the behavior of the verbal community to better support the patient's independence. This may include behaviors such as improving delivery of mands or altering communication styles so as to encourage verbal behavior instead of inadvertently punishing it.

Summary

Perhaps the most valuable contributions of Skinner's analysis for studying dementia are its focus on three major themes. First, Skinner conceptualizes *any* behavior (not just vocal behavior, but written, gestural, etc…) that exerts its effect through the actions of another person as being "verbal." This point is worth emphasizing because many take "verbal behavior" to be equivalent with "speaking" when in fact verbal behavior can involve gesturing, unintelligible vocalizations, or writing. Conceptualizing verbal behavior as more than just speaking can help caregivers interpret a variety of different behaviors as being verbal in nature and serving a social function.

This emphasis on function versus topography of behavior is the second important theme in Skinner's analysis that is beneficial for studying dementia. Skinner's focus on function and environmental causation encourages theorists to examine the social context in which verbal behavior occurs and the transactional influence of the patient's verbal behavior on the verbal community, and the verbal community's response on the patient's verbal repertoire. In general, those studying dementia have placed less emphasis on understanding the social context in which verbal behavior occurs, and how the verbal community can contribute to maintaining existing repertoires or, conversely, exacerbate existing deficits and cause excess disability. Because conditions like Alzheimer's disease cause progressive and irreversible impairment, changing the behavior of the patient's verbal community may be more realistic than teaching the patient new repertoires or reestablishing lost ones (Gentry & Fisher, 2007).

Furthermore, as many of the examples described previously illustrate, the focus on function may also help one better understand that seemingly disruptive behaviors (e.g., loud moaning, calling out, or repeating questions) can serve important social communicative functions and should not necessarily be eliminated through the use of psychotropic medications. The situation above concerning physical and verbal aggression during ADLs provides a good example of this point. Simply eliminating behavior through the use of medication could be considered unethical in that medications exacerbate the loss of verbal behavior in individuals who are already losing it as a consequence of their disease. In addition, an important social need would potentially be left unmet.

Third, Skinner's analysis insists on fully accounting for the environmental contingencies that affect verbal behavior versus ascribing such behavior to a ghostly (Baum, 2005) inner agent. This contrasts with how impairments in verbal behavior related to dementia have been traditionally conceptualized. Research in the communication disorders literature has thoroughly described specific topographies of verbal deficits associated with different stages of the disease process (see Kempler, 1991 for an excellent example), but has been less fruitful in terms of understanding their causes and in designing interventions for deficits in verbal behavior. Furthermore, because Alzheimer's disease and other dementias have biological correlates (e.g., brain atrophy, declines in neurotransmitters, toxic accumulations of twisted proteins such as beta amyloid), language disturbance is often attributed primarily to biological effects of the disease. Attributing deterioration solely to biological processes has stifled theoretical and empirical inquiry into environmentally-based causes and interventions, although some notable exceptions exist (e.g., Kitwood, 1997). Skinner's formulation could potentially move theorists away from exclusive reliance on internal causes of behavior. It places the analysis in the environment, which is currently much more manipulable given that medications for dementia (e.g., cholinesterase inhibitors) have only modest benefits (Whitehouse, 2008, pp. 117-119).

Skinner's *Verbal Behavior* is replete with ideas that can be applied to the study of dementia and only a portion of Skinner's overall analysis was addressed in the current paper. As Giles (1999) notes, there is an inherent need to better understand through research the injustices put on the elderly as they struggle to communicate effectively. It is hoped that the examples and empirical work described throughout this paper will inspire the reader to explore this literature further and lead to the creation of ideas for empirical work in this under-developed, yet critically important area.

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