Dance Movement Therapy for Persons with Dementia of the Alzheimer Type: A Dynamical Systems Perspective of Personhood

By

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DANCE MOVEMENT THERAPY FOR PERSONS WITH DEMENTIA OF THE ALZHEIMER TYPE: A DYNAMICAL SYSTEMS PERSPECTIVE OF PERSONHOOD

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Elaine A. Pelletier–Dance movement therapy for persons with dementia.

Approval Page

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When I try
to draw
a picture
it often
turns to music.
And in it
it says

dance across the notes
twirl across the
sharps and flats
and rest
as you slide down a twisty rest.

Lila Herzog, April 1996

My gratitude and blessings go out to the many residents at Riverview Health Centre who danced with me.

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Elaine A. Pelletier–Dance movement therapy for persons with dementia.

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Table of Contents

List Figures

List Figures continued

List of Tables

Elaine A. Pelletier–Dance movement therapy for persons with dementia.

Elaine A. Pelletier–Dance movement therapy for persons with dementia.

Abstract

Therapeutic recreational activities, rather than diversional activities are beneficial for persons with dementia of the Alzheimer type (DAT). Research shows that low intensity exercise, creative / developmental movement, music activities, and spiritual / sensory experiences are associated with significant improvements in cognitive, affective, motor, or behavioral skills of persons with dementia. There is little research in the area of dance movement therapy (DMT) for persons with DAT. A review of relevant research suggested dance movement therapy is a therapeutic activity that contains many of the qualities beneficial specifically for persons with late-stage DAT. The theoretical foundation of dynamical systems theory supported that the benefits of therapeutic recreational activities (including DMT) result from interactions among key components (i.e., activity and arousal), which promote the emergence of personhood in people with dementia. This research explored the possibility that each participant with late-stage DAT would have a greater, positive behavioral response during an individualized DMT program as compared to normal daily activity. The study was a single-system research methodology with an ABAB reversal design. The observed responses, to the two conditions (Daily Activity and DMT) by four people with DAT were scored with The Positive Response Schedule (Perrin, 1997). Intrasystem analyses showed that two of the female participants with late-stage DAT had significant positive responses to the DMT. The third female participant, who had mild DAT, did not have a significant response to the DMT. The lone male participant with late-stage DAT did not have a significant response to the DMT. Intersystem analysis supported the significance of the two positive responses and provided for interesting discussion on the two nonsignificant responses. Social validity questionnaires with participants and concerned persons supported the use of DMT with persons with DAT. DMT should be recognized as an innovative intervention for enabling and enhancing positive responses of persons with late-stage DAT.

Elaine A. Pelletier–Dance movement therapy for persons with dementia.

Introduction

Self is an emergent property of a complex hierarchy of neural processes, a set of models of who one is, a complex network of representations, integrated into the model of the world created by the brain and qualitatively similar in important respects to that model. Each individual has many such representations, although only one self-schema can be fully active at any given time. As these self-representations develop through childhood, so does the capacity of the individual to organize and explain his or her experience (Grigsby & Stevens, 2000, p. 329; emphasis added).

The traditional biomedical approach to the experience of dementia is that dementia results in a 'loss of self' (Lyman, 1998). An emerging alternative to this approach is the challenge to caregivers to recognize the personhood of people with dementia (Kitwood, 1997; Lyman, 1998; Perrin & May, 2000). Caregivers may work to maintain the personhood of people with dementia by promoting skills for the re-affirming of the changed self (Lyman, 1998). Kitwood identifies personhood as the status of a person within a relationship or social context. Following Kitwood (1997) one may consider the emergent self to be the experience of personhood, but with an emphasis on the activities of this experience and the personal significance attached to these. Therefore the focus can be on understanding the self of personhood as emergent from behaviors such as perceiving, intending, moving, learning, and remembering, such that the experiential context and the brain/body unit is recognized as a self-organizing system forming patterns according to discoverable, nonlinear dynamical laws (Kelso, 1995). Thus in the context of behaviors such as perceiving, intending, moving, learning, and remembering, the pattern of behavior recognizable as personhood can emerge despite an individual's experience of dementia.

Stockley relates Leventhal's (1988, as cited in Stockley, 1992) proposition of a 'reverse development' in people near the end of life. Kitwood also refers to a reverse development in dementia, suggesting that "...many aspects of the psyche that had, for a long time, been individual and 'internal', are again made over to the interpersonal milieu" (1997, p. 69). A dynamical systems perspective can offer a window onto the sort of 'landscape' a reverse development might entail. For example Kelso (1995) describes how chaotic behaviors from a parameter change in one direction may persist through that point of the parameter change as the system moves back in the other direction. The significance of this is that many different observable behavioral states may share a parameter value depending on the direction of parameter change. This suggests that depending on the direction of the developmental or pathological change, an activity such as moving, perceiving, remembering can occur at the same level of functioning (e.g., perceptual ability) but be associated with different emergent behaviors. One cannot assume then that a reverse development in dementia entails a reversal of the trajectory of child development and associated behaviors. As the person's brain is compromised by the disease, change on some control parameter results in a change in behavior of the person; but as yet there is little explanation as to why this 'loss of self' manifests.

A dynamical systems perspective may offer a view into this common 'loss of self' experienced by people with dementia of the Alzheimer type (DAT) despite the heterogeneous nature and progression of the disease. The control parameters that guide the emergence of personhood may be common across individuals or may be incredibly varied. Based on a large body of research though, Grigsby and Stevens (2000) say that the most important determinates of behavior are our habits and our systems of motivation and emotion.

> An individual's affective status and his or her physiological motivational status, in conjunction with the level of arousal and activity level are among the control parameters that determine his or her physiological and psychological state at any given time (Grigsby and Stevens, 2000, p. 303).

Addressing this issue of loss of self in dementia Holstein (1998) encourages researchers to enlarge their field of view rather than to narrow it; to allow research into DAT from many disciplines to enter into our own context of research. She says that "[i]t is not about abstract notions of personhood defined in terms, for example, of moral agency; it is about an embodied personhood expressed within a context, and through relationships" (Holstein, 1998, p. 13). To avoid the negative behaviors and affective states of people with DAT as outcomes of deprived or stressful environments, Morgan and Stewart (1997) suggest that it is necessary to recognize individually determined, optimal levels of stimulation (activity and arousal) as dimensions of personal experience. A dynamical systems perspective promotes understanding the components of these dimensions as the coordinative structures and the controlling parameters that guide a person with DAT into personhood. By focusing on the possible, coordinative structures of personhood one may discover what Saxton and Swihart (1989) call the presence and extent of abilities preserved despite DAT. Thus understanding the dynamic nature of personhood may open up therapeutic possibilities that promote the emergence of other abilities (for example improvements in cognitive or functional abilities).

Pulsford (1997) says that therapeutic activity for persons with DAT needs to embrace a value system whereby these persons are viewed as having a disability rather than as persons incapable of doing things. The quality of activity he promotes (physical activity that stimulates self-awareness, motivation, and interpersonal communication, while allowing for both verbal and nonverbal experience) can be found in a dance movement therapeutic activity. Marian Chace began dance movement therapy (DMT) with older adults with dementia in 1942 (Chaiklin, 1975). Knowledge in the field has been developing steadily toward the understanding that a lack of movement and body awareness is the direct result of inactivity (Stockley, 1992). Motivation, emotion and interaction are areas that DMT can bring into awareness and effect change in by working with the structure and meaning of the body and its movement (Bartenieff & Lewis, 1997). DMT is the most basic of the therapeutic arts as its focus is on the body as the instrument (Hirsch, 1990). Through her work with people with dementia Hirsch found that the lack of motivation to initiate movement is the major challenge. DMT can stimulate attention, involvement and participation in people who seem to lack intrinsic motivation (Caf, Kroflic & Tancig, 1997). Arakawa-Davies (1997) suggests that since verbal communication is often difficult for people with dementia, a body-orientation such as that used in DMT has great potential as a therapeutic technique for them. Although the research on DMT with people with dementia is quite rare there exists a large body of research on therapeutic recreational activities with persons with DAT (mostly early- and mid- stage), which addresses the relevant components of physical activity and or emotional arousal.

This research study of a DMT intervention with people with late-stage Alzheimer disease uses a dynamical systems perspective (Kelso, 1992) as a theoretical foundation. Kelso suggests that when applying a dynamical systems model of behavior one must first identify the collective variables that make up the observable patterns of behavior. This approach then anticipates the observable and identifiable, stable dynamic pattern of personhood as emergent from certain collective components of the personal and social environment of the person with dementia. Subsequently the present research project is founded upon the idea that physical activity with an emotional personal component (activity and arousal) may be the controlling parameter for the dynamical emergence of personhood. The purpose of the project is primarily to explore the potentials of dance movement as a therapeutic activity for persons with late-stage dementia of the Alzheimer type. The research questions look specifically at:

1. If persons with dementia of the Alzheimer type will have greater positive responses to a dance movement therapy intervention as compared to normal daily activity. [The Positive Response Schedule (Perrin, 1997) will be used to measure positive response.]
2. If persons with dementia of the Alzheimer type will express previously unrecognized, retained cognitive abilities after a dance movement therapy intervention. [The Severe Impairment Battery (Saxton & Swihart, 1989)] will be used to measure cognitive abilities.]

The literature review, which follows, begins with a brief introduction into dementia, how dementia relates to the concept of personhood, and a simplified account of some features of dynamical systems theory. Following this focused look at dementia and the theoretical foundation of dynamical systems the literature supporting therapeutic recreation with persons with dementia is reviewed much more comprehensively. This part of the literature review has a creative arts and physical activity bias that can better frame the limited relevant research using dance movement therapy with persons with dementia. Whenever possible reference is made to research that reveals and enlightens the potential components of emergent personhood of interest in this study (activity and arousal). The last part of the literature review describes single-system methodology and its use in relevant research. The methods chapter fully describes the single-system design of the proposed research including all the information necessary for replication the study.

The results chapter presents the findings of both the intrasystem and intersystem analyses. These analyses are delineated according to the overall scores of the dependent variable, as well as according to the subcomponent scores of this dependent variable. This chapter ends with a report of the findings from the social validity questionnaires.

The final chapter provides a discussion on the findings of the intrasystem, intersystem, and social validity analyses. The significance of the subcomponents Action and Arousal is considered; along with the findings of each individual participant. The implications of the findings are discussed briefly, according to both research and clinical practice paradigms. Personhood, from a dynamical systems perspective, is then re-addressed. Some implications of the findings follow this and the chapter closes with the presentation of some possible directions.

LITERATURE REVIEW

Dementia of the Alzheimer Type

Dementia is a broad, descriptive term for a condition that involves a decline in the memory and cognitive functions of a person (Kitwood, 1997). Dementia is associated primarily with damage to brain tissue, although it can be associated with other pathologies or physiological disturbance. Kitwood identifies three main categories of dementia: (1) Alzheimer type involving loss of neurons of the cortex, general brain atrophy, and degeneration of cell structure; (2) vascular type associated with cerebrovascular disease causing damage to both cortical and sub-cortical areas of the brain, and (3) mixed type where signs of the first and the second types are present. Dementia tends to be classified as mild, moderate, or severe, depending on the amount of independence the person with the disease is able to retain (Burns & Levy, 1992; Kitwood, 1997).

Dementia of the Alzheimer type (DAT) is a progressive and degenerative disorder with gradual onset. Early in the disease there is forgetfulness, loss of initiative and disorientation (Kerner, Patterson, Grant, & Kaplan, 1998). Loss of memory affects many adaptive mechanisms, which manifest as a decline of personal and social behaviors (Wald, 1983). Cortical atrophy, neurofibrillary tangles and senile plaques are present in the brains of people with DAT (Katzman, 1986; Kemper, 1984; Khachaturian, 1985; all as cited in La Rue, 1992): Although some atrophy of the cerebral cortex is normal in human aging, the cognitive impairment seen in DAT is considered to be associated specifically with neuritic plaques and a significant reduction in the functioning of cholinergic neurons of the human brain (Cohen, 1997; Perrin & May, 2000). However Kitwood (1997) suggests, and Perrin and May (2000) concur, that there is not conclusive evidence for a single, linear cause of DAT.

La Rue (1992) says that in people with DAT early memory loss is heterogeneous, as is loss of language and visuospatial abilities. La Rue notes that the changes, in personality, affect and behavior, seen in people with DAT are even more heterogeneous than the early cognitive deficits these people experience. Despite the heterogeneous expression of DAT, there appear to be clinically distinct subtypes of DAT (Burns & Levy, 1992). These sub-types, based upon identifying clinical features (psychiatric symptoms, behavioral disturbance, and neurological signs; Burns & Levy, 1992) are generally categorized as early-, mid-, and late-stage (Cohen, 1997).

Assessment of motor and psychomotor impairment has been shown to have comparable sensitivity to traditional cognitive assessments for determining DAT at the earliest stages (Kluger et al., 1997). Cohen says that during the late-stage of DAT the person becomes less mobile with increasing physical rigidity; primitive reflexes may return; appetite decreases; apraxia may cause eating and speaking problems; communication suffers; bowel and bladder incontinence occur; the sleep-wake cycle may be disturbed; hallucinations, if present, persist; and death may result from respiratory or urinary tract infections. Frontal gait disorder (O'Keeffee et al., 1996), related to deep-tendon reflexes, plantar responses, paratonic muscle rigidity, and release signs (Franssen et al., 1993; Bakchine et al., 1989) is experienced more by people with late-stage DAT. These conditions contribute to some of the immobility and functional decline seen in persons with late-stage DAT (Franssen et al., 1993; Reisberg et al., 1999a; Reisberg et al., 1999b).

Personhood Despite Dementia

Building upon Barns, Sack, and Shore's (1973; as cited in Kitwood, 1997) idea of the 'dementing process' as an 'involuntionary spiral', Kitwood suggests that there is interplay between neurological and psychological processes in the experience of dementia. He describes the classical view of the dementing process, which is to see DAT as a neurological impairment within a malignant disability model of social psychology. He considers this classical view as undermining the personhood of people with DAT. Kitwood defines personhood as "...a standing or status that is bestowed upon one human being, by others, in the context of relationship and social being. It implies recognition, respect and trust" (1997, p. 8).

To assist in the understanding of this definition Kitwood develops a representational model of an individual. First he equates an individual's neurological state or event with that individual's psychological experience. Kitwood means to "emphasis the assumption that psychology and neurology are, in truth, inseparable" (1997, p. 17). Kitwood does not suggest that one *causes* the other but rather that there is a neurological event or state, which is equivalent to a psychological state or event. Citing learning theory (Kandel & Hawkin, 1992) and research into neuronal plasticity (Damasio, 1995) Kitwood states that human experience is an expression of the continual change and development of the brain (both references as cited in Kitwood, 1997). Lastly, Kitwood adds to his representation of 'the situation of the individual' the consequences of human disease or degenerative processes. The final result is a simple representation of the individual for which Kitwood uses the following simple formula:

$$\frac{\Psi \equiv \mathbf{b}}{(B^{d}, B_{p})}$$

Where the psychological experience (Ψ), is equivalent ($\equiv$), to the brain's activity (**b**), and these are subject to (——), the brain's continual development (B^{d}), and the brain's possible pathology (B_{p}). By developing a model of 'the individual' Kitwood gives substance to his desire to focus on the person not the disease while recognizing that the whole person is comprised of components. This model of the individual allows us to consider the myriad of factors, which combine to emerge as the person without an overemphasis on the neural pathology. From this more complete perspective of what makes up a person we are then better able to be conscious of the social context in which we are placing that person.

Kitwood defined personhood as emerging from this interaction between the individual and [other person(s) in] a social context. Further to this he comments that,

> "...neuroscience now suggests that there may be very great differences between human beings in the degree to which nerve architecture has developed as a result of learning and experience. It follows that individuals may vary considerably in the extent to which they are able to withstand processes in the brain that destroy synapses, and hence in their resistance to dementia.... [and since] All events in human interaction—great and small—have their counterpart at a neurological level....[a] malignant social psychology may actually be damaging to nerve tissue. Dementia may be induced in part, by the stress of life" (1997, p. 19).

This comment shows that Kitwood recognizes the nonlinear, multi-causal, and interactional nature of human experience. Combining the view of this 'human context' with his simple formula of the individual, Kitwood feels it is possible to have an overall perspective where the interests of both science and the person with DAT can be recognized and served. Indeed researchers in neuroscience recognize that dissection of a system into smaller parts, which can be studied in isolation, can further the understanding of some properties of the individual units, but sheds little light as to the system's general organizational principles (Kelso, 1992).

General organizational principles are important to understand when the parts of the system interact and change mutually creating information that is contained in neither part alone. This quality is what Thelen (1992) calls the hallmark of a dynamical system. Thelen points out that

> [o]ne of the core assumptions [in dynamical systems theory] is that behavior is assembled in real and developmental time from multiple, parallel subsystems within a context, and that there is no logical distinction between subsystems that are intrinsic to the organism and those aspects of the environment that contribute to the emergent behavior (1992, p. 471).

Kitwood (1997) identifies three cultural subsystems that contribute to the emergence of the dementing process. These are (1) the organizations which produce the knowledge and structures that maintain the status quo, (2) the norms of acceptable behaviors, and (3) the beliefs about reality and truth. These subsystems once established as the dominate culture are very resistance to change and "[t]he shift from the old culture to the new [a culture engaged with the personhood of people with DAT] is not a matter of adding a few items that were missing, but of seeing almost every feature in a different way" (Kitwood, 1997, p. 135). Change in perceptions that shift a cultural view may seem an ungainly subject. However it is worth considering Kitwood's subsystems as the features governing and maintaining the dementing process; and asking what can emerge from a reorganization of perceptions, knowledge, structure, beliefs, and behaviors.

Understanding and implementing Kitwood's model of the experience of dementia requires a new way of seeing the relevant subsystems. Both Kitwood's concept of personhood and dynamical systems theory are methods to model the nonlinear, multi-causal, and interactional nature of human experience. Therefore by considering a few basic features of dynamical systems theory, and by reflecting on the epistemological advantage of looking for general organizational principles, a theoretical foundation to an intervention for persons with DAT, making use of both Kitwood's concept of personhood and the current direction of therapeutic recreation for persons with dementia, may emerge.

Elements of a Dynamical Systems Approach

Recently Grigsby and Stevens (2000) presented a neurodynamic model of personality in which they summarize the essential features of a dynamical system. Grigsby and Stevens's main goal in the development of their model is to clarify and explain the biological basis of the stable but flexible nature of personality. They say that personality emerges from the action of various functional brain systems. They state further that "[t]hese functional systems themselves are composed of hierarchically ordered subsystems" (Grigsby and Stevens, 2000, p. 19). Based within research supporting the hierarchical, modular, and distributed nature of the human brain, their model presents that personality reflects these properties, as well as those of a dynamical system which is self-organizing, existing on the edge of chaos, and exhibiting probabilities of minimum energy expenditure (Grisby & Stevens, 2000). These properties of a dynamical system—self-organization, the edge of chaos, and probabilities will now be explained further.

Self-Organization

It is generally considered that the brain is a functional system with subsystems such that function reflects, but is not a slave to, the structure (Grigsby & Stevens, 2000). Both structural and functional systems of the brain are organized into modules of excitatory and inhibitory neurons. A module may have few or billions of these interconnecting, overlapping neurons (Edelman, 1992). A module can exist at many different levels of organization; comprised of sub-components at several different levels or becoming the sub-component of another higher-level module (Grigsby & Stevens, 2000). These modules interact to form patterns or neural networks (Edelman, 1992). Edelman says that the "*selective coordination*" of these complex patterns, which can be strengthened through correlation and coordination, that is the essential bridge between physiology and psychology. This is similar to Kitwood's premise that psychology and neurology are inseparable: Although with Edelman's suggestion the binding of these forms of knowledge can be further considered. This *binding element* is then selective coordination or as Kelso (1995) describes it, self-organization.

Kelso (1995) says that "...the brain is *fundamentally* a pattern-forming, self-organizing, dynamical system poised on the brink of instability" (1995, p.

xvii; emphasis in the original). Self-organization, although a seeming contradiction, means that there is no *self* (central processor, decider, ghost in the machine), organizing and producing behavior. Rather the sub-components cooperate (or constrain each other) to generate the current pattern of behavior. Self-organized pattern formation involves the same general principles regardless of the level at which we analyze the behavior (i.e., quantum, molecular, physiological, psychological; Kelso, 1995). Therefore these principles may be used as guides toward the discovery of whether a dynamical pattern of experience on the neurological level (or at the level of cognition, etc.) can reorganize given certain changes at the level of physical activity generated within a socio-emotional environment such as that occurring during dance movement therapy.

Kelso (1995) explains that a pattern can: (a) persist despite varying environmental conditions (stability), and (b) adjust to changing internal or external conditions (adaptability). For instance, stability of behavior occurs with each step one takes while walking. The brain recruits certain muscles, which self-organize within a relatively invariant temporal sequence (of activation of agonist and antagonist muscles), such that walking emerges as a functional relationship from all the *relevant* physical and neural sub-components (Thelen, Kelso, & Fogel, 1987). Regardless of the shoes one wears or the ground walked upon, the behavior remains identifiable as walking. Walking behavior remains stable within the limits of this system. Movement is ‘controlled’ through scalar changes in the speed and force of muscles. The observable and experiential qualities of walking have stability of form determined in particular by the relative timing of the coordination of certain muscles and the control of muscle speed and force, not by a preexisting, encoded neural program; a representation in the nervous system for the trajectories of walking (Thelen & Fogel, 1989). Thus although the muscles interact relatively invariantly, movement can be controlled through the speed and force directed to those muscles (the coordinative structure). The dynamic qualities of these muscle groups allow flexibility on dimensions of tension, force, and initial position.

Adaptability occurs in a system in response to change in one or more relevant subcomponents. While walking one may increase speed by increasing the number of steps taken per minute. At a critical point of increased speed the system (a walking person) can shift into another mode—that of jogging or running (depending upon the speed). For horse locomotion (at increasing speed of limb movement) this shift from a walking to a trotting gait will occur at a point determined by energy efficiency (Thelen, Kelso, & Fogel, 1987).

> Thus, as the system is scaled past critical bounds on a sensitive parameter, qualitatively new modes of organization emerge in a stage like fashion. The intermediate states could conceivably exist—a state somewhere between random and turbulent flow or between walking and trotting—but they do not because the transitional states are, on some dimension, unstable. Within the stable states, fluctuations are tolerated,

> but when these fluctuations exceed critical limits, the phase shift occurs (Thelen & Fogel, 1989, pp. 34-35).

So rather than a central motor program, there is self-organization of overlapping gaits across a range of speeds. This allows the gait to remain stable despite variation of internal and external demands (Kelso, 1995). This illustration of the stability and adaptability of self-organized systems has introduced the phase shift, an essential feature of dynamical systems.

The Edge of Chaos

As general principles, the dynamical principles of motor behavior are applicable to skilled, mature and developing behavior (Kelso, 1995; Thelen, Kelso, & Fogel, 1987; Thelen & Fogel, 1989;Thelen & Smith, 1994). General dynamical principles can be found to explain change in both animate and inanimate forms (Grigsby & Stevens, 2000; Kelso, 1995; West, 1997). Grigsby and Stevens outline how systems that change over time fall generally into just a few categories. Those categories can be determined by the interval over which the coordinated variables change. This interval can be random, such as a one-time event (sudden kidney failure due to toxic exposure resulting in death), may be somewhat periodic (renal shock due to kidney stones which can be recovered from but may recur if the stones reform), or may be of the type termed chaotic.

True periodic change is like the swinging of a driven pendulum where oscillations are a constant number over a set period of time. Sleep-wake cycles, certain brain wave activity (Grigsby & Stevens, 2000) and the rising and setting of the sun or moon (West, 1997) are examples of fairly predictable periodic changes. The periodic activity of a driven pendulum cycles within certain given parameters while the activity of a free-swinging pendulum will eventually converge on the lowest point of its swing path. Both these systems have stable behavior regardless of the initial starting point. These types of systems represent, in dynamical systems terminology, stable attractors. The free pendulum is characteristic of a point attractor (systems change converges to a single point), while the driven pendulum is characteristic of a periodic or limit cycle attractor (systems cycle within a specific range of possibility) (Grigsby & Stevens, 2000; Kelso, 1995).

The behavior referred to as chaotic is seemingly unpredictable, and unlike the previously mentioned attractors a chaotic or 'strange' attractor is very sensitive to the initial conditions of the behavioral change; including the direction of that change (Kelso, 1995). Grigsby and Stevens say that "...chaotic systems are extremely sensitive to changes in even trivial environmental conditions, [and] they may be susceptible to perturbation by a number of factors" (2000, pp. 108-110). They describe how weather patterns are an example of a system on the edge of chaos. Weather patterns may be relatively stable but very sensitive to certain slight changes in conditions at certain times: Whereas at other times within other conditional variables a similar change (slight or great) may not perturb the stable pattern.

Skarda and Freeman (1987) say that storms are different than biological dynamical systems as storms are not self-promoting thus "[s]elf-preservation plays a central role in biological self-organizing systems. [and] ...a self-organized neural process that is not self-promoting disrupts normal functioning at all levels" (p. 173). Describing the biological dynamical system of infant motor development, Thelen and Fisher (1982) explain that in the first month of life the 'disappearance' of the infant stepping reflex does not result from a neurological change due to development (as was previously thought). By standing four month old infants erect in water up to their torsos, Thelen and Fisher show that this environmental change allows the previous coordination (of a certain weight-to-muscle-strength ratio) to reappear and manifest as the 'lost' stepping behavior. Thus the stepping behavior does not become neurologically extinguished in the growing infant. A specific but slight change in weight to muscle strength ratio, which occurs with growth and development, is responsible for the change in behavior (Thelen & Fisher, 1982).

Another example of the sensitivity of systems behavior to even slight change is described in Thelen and Smith's (1994) report of phase shift in infant arousal behavior. These researchers show that a phase shift in a system can be dependent on the level of energy available. They explain that while an infant is asleep he or she will display no kicking or stepping behavior. However while awake the frequency of infant kicks or steps is highly correlated to the level of the infant's arousal (Thelen & Smith, 1994). Then at the highest level of energetic activation, when the infant is crying hard, the infant will shift to another attractor (into another mode of behavior)—that of tonic extensor rigidity (Thelen & Smith, 1994). Thelen and Smith note that kicking and stepping can occur only when the infant's muscles are in an appropriate range of activation. In a dynamical system the scalar factor can be intrinsic to the biological organism as seen with the energy scaling of infant arousal or the significant ratio explained by Thelen and Fisher (1982); or the controlling parameter may have a decidedly environmental source. Fogel (1992) shows that a scalar change in infant postural position affects the amount and intensity of infant gaze toward his or her mother. The manner of interaction between mother and child is an environmental source of scalar change affecting infant response and subsequently infant development (Fogel, 1992).

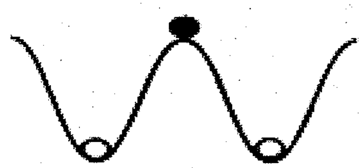
Dynamical systems theory describes then a pattern of behavior appearing stable as a result of the interaction and integration of many coupled systems (Thelen, Kelso, & Fogel, 1987). A dynamical system may appear unaffected by the mundane details of the 'here-and-now' (Kelso, 1995; Thelen & Smith, 1994). However the theory suggests that it is the activity of the organism and the environment of that experience which determine how interaction and integration will occur. Interaction and integration promote changes to the relevant system, which ultimately produce development of that system (Thelen & Smith, 1994). Thus one may view human development (child and adult as well as all other stable complex systems) as a controlled chaos, not unlike creative dance.

Probabilities

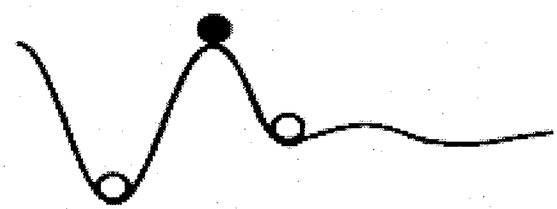
An attractor, the range of preferred activity of a system, stands in opposition to a repellor, the range of activity a system avoids (Grigsby & Stevens, 2000). Viewing attractors as 'valleys of preference' and repellors as 'hills of avoidance' the range of a system can be seen as relatively shallow or deep, and flat or steep depending on the coordination components (see Figure 2.I). This landscape analogy describes what is called a phase space (Grigsby & Stevens 2000; Kelso, 1995). The nature of the phase space can be changed as the components change. When components change the likelihood of the system exhibiting a certain behavior (an attractor) over another behavior (a repellor) varies. When a behavior can exist only within a range of given components, fluctuation outside this range will shift the system to another behavior. A repellor is an unstable state where the slightest change can perturb the system into one of many (or few) possible stable states.

The phase space, depicted as Drawing A in Figure 2.I is on the brink of instability and has the possibility (unfilled circle) of two attractors each having an equal probability of maintaining a stable state. The phase space, depicted as Drawing B is also shown as on the brink of instability. However the stability of the possible states of this system differ. The possible state depicted to the left of the critical state or unstable repellor is the same as that in A. The situation to the right is a very shallow basin of attraction, as are those even further to the right. The state change in the direction of the right side attractor implies that the attractor leads to a series of weak attractors and creates the probability of unstable behaviors over time. Also implicit in depiction B is the probability of remaining in these unstable states is greater than a return to the deeper basin of a stable state. This is shown by the steepness of the hill of the repellor; to the left it is much greater than the flatter repellor to the right.

The phase space is a way of understanding the probabilities of change in non-linear complex systems. For example, apathetic and passive behavior may represent a very strong attractor for a person with DAT whose general environment is impersonal and confusing and presents as a repellor to engaged and cognitively challenging experience. An even subtle change in this environment, or the person's physiological, neurological, or say emotional state could reduce the basin of attraction for this passive behavior; resulting in less apathetic behavior. Alternately a drastic change in the attractors or repellors (such as recovery of an impaired sensory function thus less sensory deprivation; a more stimulating and interesting environment) could shift this passive behavior into another stable attractor of willingness to engage when approached, which could be the key component to maintenance of mobility and retained independence. Conversely other coordinated conditions for change to another attractor (e.g., a loss of physical mobility leading to further dependence in a



Drawing A shows two possible stable states (unfilled circles) with equally deep basins of attraction.



Drawing B shows one possible stable state to the left, which has a deep basin of attraction relative to the right basin of attraction. The right basin of attraction, which is much more shallow depicts an unstable state that can be easily perturbed.

Figure 2.1. Illustration of attractors and repellors. Drawings A and B show two different phase spaces with different probabilities for stable behavior (unfilled circles). Filled circles illustrate unstable states. (Adapted from Grigsby & Stevens, 2000 and Kelso, 1995)

depriving environment) could lead to a cascade of loss of physical and cognitive function, emotional engagement and thus of self; such as Kitwood describes as the dementing process. Since the probabilities of change (and response to change) are as varied as the individuals this view of attractors and repellors can be helpful in framing the controlling parameters of possible change (stability and adaptability) within each person.

Chaotic systems are generally considered to be unpredictable. This does not mean though that these systems cannot be understood. Often called 'nonequilibrium dynamical systems', these systems exhibit properties of stability that evolve over time toward a critical state. Kelso (1995) writes about the coordination of components as a complexity, which yields a simple stability. However as the complexity increases, a very small change in one simple component can cause massive and complex change in the system. The observable change of state that water molecules undergo from gas to fluid to solid is an ideal example. This also describes another important aspect of probabilities in a dynamical system. Predicting the probability of this type of change of state of water at a critical temperature could not be made on the basis of information of the current state (Grigsby & Stevens, 2000; Kelso, 1995).

> Many if not most interesting phenomena in nature and society involve discontinuities, sudden changes, and it is only relatively recently in the history of science that we have available the appropriate

mathematical disciplines to describe the behavior of such changes (West, 1997, p. 108[6]).

'Predicting the unpredictable' like self-organization seems to be a contradiction of terminology. The basis of such prediction in non-linear dynamical systems is the principle of least energy expenditure. According to Grigsby and Stevens (2000) neural networks operate on this principle. The highest probability of activation is associated with networks needing the least energy for activation or maintenance, and so function as attractors. High-energy networks are repellors, unstable with short-lived activation. Therefore the 'well-worn', associated, and strengthened neural pathways (Hebb, 1949) have a higher probability of activation. The same 'Hebbian' experiential process that strengthens neural networks allows for plasticity of the brain and adaptability of behavior such that "[c]hanges in either the internal or external environment may alter significantly the likelihood that a given stimulus will elicit a specific response" (Grigsby & Stevens, 2000, p. 121).

This extremely simplified introduction to dynamical systems theory is meant to frame Kitwood's definition of personhood as an emergent property of the self-organization of the human brain and body within social-emotional interaction. Additionally this view may help to understand the role of movement in the emergence of this socially contextualized personhood. "The key property of brain dynamics, we suggest, is control of body movement in space for the self-promoting purposes of search, attack, ingestion, escape, and reproduction"

(Skarda & Freeman, 1987, p. 173). Further on in this chapter studies are reviewed that lend support to this idea that body movement is an important component of the neural dynamics of human experience.

Epistemology and Features of a Dynamical Systems Approach

Kitwood (1997) provides a deeply human rationale for viewing people with dementia in a new way. Dynamical systems theory is somewhat more impersonal in method but ultimately converges on the same experience. Therefore aside from a basic understanding of self-organization, chaotic change and probabilities of change this theoretical framework should include an explanation of how this knowledge differs from other ways of viewing human experience. West (1997) provides such an analysis describing how non-equilibrium dynamical systems theory can assist in understanding the complexities of social and psychological sciences. He uses a comparative analysis of traditional scientific epistemology and nontraditional (dynamical systems based) epistemology. West says that the underlying (linear model) assumptions of the physical sciences have been the paradigm for the social and psychological sciences. By rethinking this paradigm West shows that nonlinear modeling is *necessary* to understand social and psychological phenomena. Nonlinear modeling is necessary because it can reduce the large number of degrees of freedom involved in human neural systems down to a minimum set of principles independent of level (Kelso, 1992; as well as social systems, see West, 1997)). This contrasts with a linear model of understanding that proposes a central neural pattern generator dependent on a vast processing capability (Kelso, 1992; Thelen, Kelso, & Fogel, 1987; Thelen & Smith, 1994).

Kelso (1992) says that patterns emerge in a dynamical system governed by a set of general principles. These patterns, which can be mathematically described, are independent of the material structure that gives rise to them. Further, Kelso explains that an understanding of this abstraction from observed properties to general principles is assisted by the following approach:

- Identify the collective variables that make up the observable patterns (at whatever level of observation).
- Study the pattern dynamics toward identifying stable dynamic patterns.
- Identify the parameters that control shifts into other patterns.
- Study both the collective and component variables for the behavioral patterns of interest.

Kelso summarizes this operational approach saying the observable patterns are used to make predictions that are then tested experimentally, followed by a theoretical modeling of these experimentally observable features. The goal of the approach is to formulate a set of theoretical concepts that has far fewer features than the large set of experimental features.

Although this is a rather superficial account of dynamical systems hopely it will elucidate a clinical perspective of personhood, such that personhood becomes more than an abstraction. Within a theoretical framework of dynamical systems, personhood can be an observable and identifiable pattern of behavior. This pattern of behavior may be observed to be emergent from certain collective components, self organized within parameters controlling shifts from and into other behaviors. For the purpose of this literature review and the following proposed research method the collective components of interest are the physical, and emotionally arousing aspects of activities. Driven by this theoretical framework my perspective is that a combination of physical and emotional activities provides people with dementia the opportunity for self-promoting experience (emergent personhood). According to Skarda and Freeman (1987) such self-promoting experience is the key to brain dynamics. Within the general, organizational principles of dynamical systems a change at one level (brain dynamics) can emerge as change at another level (behavioral dynamics). This perspective is then, that people with dementia have not lost 'self' but rather the necessary components of self are disorganized, in a state of chaos: By self-organizing these components through experience (in this case a DMT activity) a stable state of personhood can emerge. The next part of the review will focus on how these variables or components have been studied through experimental and therapeutic intervention with people with dementia.

Therapeutic Recreation for Persons with Dementia

Therapeutic recreational activities with persons with late-stage dementia (hereafter called LD) have not been the focus of much research (Kovach &

Magliocco, 1998). The lack of research in this area results in a situation where it is unclear as to the benefits of this type of activity with persons with LD. Kovach and Magliocco question the assumption that the extensive cognitive decline of persons with LD prohibits benefits from therapeutic recreational activities. They consider this question with a descriptive and exploratory study of the participation and behavior of 23 people with LD during various activities (within a total of 98 sessions). The activity types they look at are: music therapy, pet therapy, cooking, exercising, sensory experience, reminiscence, and spiritual activity. Observations are coded into categories of; participation (active, passive, null, dozing, unrelated); behavior (body language, facial expression, verbalization); and interaction (spontaneous participation, verbal cueing, verbal cueing and demonstration, verbal cueing and physical prompting). Additional notations are made about the type of activity, group or individual format, number of steps the activity involved, the number of senses the activity stimulated, and the number of minutes of napping or sensory calming which occurred prior to the activity.

The collected data are subject to descriptive and inferential statistics to assess relationships and differences. A content analysis of observational descriptions of participants' behavior is conducted as well. The results of this study by Kovach & Magliocco (1998) show that the highest frequency of active participation occurs during a less than 10-minute period of time. Spiritual and sensory activities engage the participants for larger periods than other types of activities; while the highest frequency of dozing and null behavior occurs during music therapy. It is interesting to note that the spiritual activity also contains a music component; along with prayer and visits with a pastoral care worker.

Analysis of activity characteristics shows that the length of prior napping or sensory calming has a significant negative association with the number of minutes of active participation in activities (r = -0.200 at α = 0.001) and that sensory stimulation has a significant positive association with the number of minutes of active participation in activities (r = 0.427 at α = 0.05). Analysis of data, for the type of interaction between therapist and participant, shows that the therapist most often used verbal cueing alone (19.64%), and that spontaneous responding by participant occurred only 7.82 % of the time. Content analysis of observational data of participant behavior (23 subjects in 48 therapeutic activities with notes made every three minutes) shows that most responses during active and passive participation in activities are subtle and nonverbal. Behaviors are clustered into emergent categories of approaching and withdrawing; relaxing and tensing; mimicking; nonverbal connecting, and verbal connecting.

From this study Kovach & Magliocco (1998) conclude that therapeutic recreational activities are appropriate activities for persons with LD. Although the time period of effective engagement seems to be less than 20 minutes they say this may be related to the quality of the caregiver assistance. The type of activities they suggest to be most effective for active engagement of person with LD are spiritual and sensory; with multiple sensory stimulation being best. They say that excessive napping or relaxation time prior to an activity is related to less active participation in that activity. However they point out that this observation may show simply that passive participation and 'napping' are behaviors common to a more naturally withdrawn type of person. They find compelling evidence for a range and variation of behavior of persons with LD, especially emotional response, and consider that caregivers may inadvertently limit the range of experience these persons' capabilities. The content analysis of behavioral responses reveals some important benefits of effective activities. They find muscle relaxation to be common but subtle in expression. They consider that the communicative responses of the participants during the activities can indicate increased awareness of surroundings and social group. They conclude the study with suggestions for therapeutic activities for people with LD. Briefly these are (1) the use of clinical indicators to assess benefits of programs on an individual basis, (2) that mimicking behavior should be considered to be an effort at active participation included into structured interventions, and (3) that if special care unit staff were more sensitized to subtle cues they would be able to anticipate need, and provide more connected care such that "...declines in cognition, functional ability, socialization, and connection to the environment may be slowed" (Kovach & Magliocco, 1998, p. 172).

The suggestion that leisure activities slow the progress of dementia can be found in other literature. Fabrigoule and associates (1995) report their longitudinal study of the relationship of social and leisure activities to the risk of developing dementia. They follow 2040 persons (65 years of age or older) for one to three years. Social and leisure activity information is collected during a baseline interview with a psychologist. The one and three year follow-ups are used to detect dementia (DSM-III-R criteria which has a 95% accuracy; Katzman, 1995). After adjustment for age and cognitive performance they find that participation in at least two of only three types of activities is associated with significant protection against the onset of dementia. These three activity types are traveling [Relative risk (RR) = .48, 95% Confidence Interval (95% CI) = .24-.94, *P* = .04], odd jobs or knitting (RR = .46, 95% CI = .26-.85, *P* = .02), and gardening (RR = .53, 95% CI = .28-.99, *P* = .05); where odd jobs, knitting, and gardening are significant only if done without difficulty. They report that the relationship between sports participation and protection against onset of dementia is at the borderline of statistic significance. Further adjustments for physical capability and occupational activity did not change the significance of these results. The protective effect of three activities (RR = .20, 95% CI = .04-.87) is greater than the protective effect of two activities (RR = .41, 95% CI = .18-.90), while one activity shows no significance (RR = .77, 95% CI = .46-1.3).

Fabrigoule and associates (1995) say that older persons who participate actively in certain types of activities seem to have less risk of developing dementia. Speculating, they suggest three explanations. The first explanation is based on the types of cognition required to perform the activities. They say that possibly cognitive functions such as innovation, initiation, and goal directed planning, as aspects of attentional control can be impaired very early in dementia. This can influence choices, leading to preference for activities which involve more automatic processes such as sports participation, visits to friends, reading, or watching television. They say the second explanation, which is supported by other research, submits that highly integrated activities stimulate and protect cognitive capacities. The third explanation rests upon how they look at the category 'nonparticipation due to difficulties'. Nonparticipation in odd jobs, or gardening due to difficulty is significant a predictor of risk for developing dementia. But these activities are not associated with risk in the categories—yes without difficulty; yes with difficulty; no for other reasons. They comment that this type of cessation of a leisure activity can be considered a predictor of risk for dementia.

Considering the findings of Fabrigoule and associates (1995), Katzman (1995) argues that highly demanding cognitive activities may increase or maintain neural functions and delay the onset of dementia. He says the biological basis for the preventative effects of highly cognitive leisure activities may be found in current research of neuronal arborization (branching interconnections between neurons) of the human brain during aging. Sacks (1997) reflects on the "relative preservation of self" in dementia. He relates that until the latest stages of dementia persons continue to be very much 'themselves', human, emotional, and in need of relationship. This preserved quality despite the ravages of the disease, Sacks says, allows for therapeutic activities that address or evoke the personal, and have great potential for success. Sacks adds that the neural embodiment of self is robust. He refers to Edelman's theory of neuronal group selection, and to Thelen's work with a dynamical systems approach to the development of cognition, as accounts of how neural connectivity can be literally shaped by a person's experiences, thoughts and actions. "If individual experience, experiential selection, so determines the developing brain, we should not perhaps be surprised that individuality, self, is preserved so long" (Sacks, 1997, p. 1213).

In light of Sacks comments the findings of Kovach and Magliocco (1998) are also not surprising. Due to the early development of sensory pathways, sensory activities will stimulate these many, well-preserved neural pathways, and so engagement of participants with LD on this dimension will have a higher probability of occurrence. Spiritual activities also engage participants with LD for a longer period of time, unlike music therapy (Kovach & Magliocco, 1998). Since the spiritual activity included music it is worth considering whether there are other components (i.e., personal significance) to such a spiritual activity other than the music that combined to affect the engagement patterns of persons with LD. Unfortunately Kovach and Magliocco give little information on the details of the activities in their study.

In a similar study with persons with dementia and participation in music therapy, art therapy, household activity, exercise and a cognitive activity Kovach and Henschel (1996) find that active participation occurs most frequently in exercise, music therapy, and art therapy (55%, 50%, and 45% of the time respectively). Cognitive activity actively engages participants for only 20 % of the time and has the largest percentage of null and dozing behavior (19% and 10% respectively). Null and dozing behavior by time for exercise are (4% and 2%); music therapy (0% and 6%); and art therapy (1% and 0%). Contrary to Kovach and Magliocco (1998), Kovach and Henschel report that daytime and early evening napping is positively associated with greater time of active participation.

Kovach and Henschel use reminiscence interviews to assess the participant's ability to make cognitive ties between a current activity and personally significant past activities. If the participants can verbalize at least two coherent thoughts reflective of the current activity a cognitive tie is considered to have been made. A three-question maximum is allowed to evoke a cognitive tie. They report an intercoder agreement of 100 %. They also find that exercise and music therapy elicit cognitive ties for 68 % and 52 % (respectively) of the participants. Only 33 % of participants make cognitive ties to cognitive activities and 31 % of participants make cognitive ties to art therapy. Kovach and Henschel report statistical significance for active participation when cognitive ties are made, over level of participation when cognitive ties are not being made

(Friedman test = 7.432, p = .024). Kovach and Henschel say that this suggests we should plan activities around the resident's remembered history, likes, and dislikes.

A second quantitative observational study concurrent with Kovach and Henschel (1996) includes a qualitative component (Kovach & Henschel, 1996b). Observations are made every three minutes along with notes of the participant's behavior and affect, and the activity therapist's behavior and affect. Participant behavior during activities is categorized as pleasure; hesitating; distractibility; and revealing and releasing self. Kovach and Henschel (1996b) report that music therapy and exercise are the activities with highest frequency of pleasure; noted as laughing and smiling. They say that distractibility is most often associated with the activity leader working closely with another participant or being less animated in affect. Interestingly an "upbeat enthusiastic" demeanor of the activity leader, while associated with active participation, is also associated with the therapist missing cues from the participant. Kovach and Henschel (1996b) find that a less structured, mellow presence of the activity leader encourages participants to express their individual agendas, while a more structured leadership format provides participants with a sense of security and direction.

Exercise and music within a combination of structured and unstructured formats may then engage persons with LD for longer periods of time that are pleasurable and cognitively associative. Rabins (1998) reports on a conference based meta-analysis (evidence tables) of treatments for DAT and other dementia. Regarding therapies like music, dance, art therapy, environmental behavioral therapy, and pet therapy the committee finds these types of therapies to be modestly effective. The conference consensus is that the benefits of these wide-ranging therapies likely result from factors common to all the different therapies. These therapies fall under the categories of psychotherapy and psychosocial treatment. They involve "...broad overlapping goals of improving quality of life and maximizing function in the context of existing deficits" (American Psychiatric Association, 1997).

Specialized Programs for Persons with Dementia

To better study the difference between specialized and traditional activity programs Buettner, Lundegren, Lago, Farrell and Smith (1996) use a quasi-experimental design with a clinical crossover pattern where both groups (nursing home residents with dementia) receive both treatments although in different orders. Each group of participants consists of people from a special care unit (hereafter called SCU). These 18 people are randomly assigned to one of two treatment groups (A or B). Another 18 people from other units of the care facility are matched to the SCU persons on gender, age within three years, and cognitive status. They are placed into the opposite group to their matched counterpart. Two subjects withdrew due to hospitalization and so their counterparts left the study.

The focus of this study by Buettner and associates (1996) is to evaluate the effects of four weeks each of two different treatment programs for people with LD. One program is the Neuro-Developmental Sequencing Program (NDSP) that is based on the premise of a reverse development to explain functional loss in people with dementia. Buettner, Kernan, and Carroll (1990) developed the NDSP as a developmental approach to exercise, which promotes movement and successful experience. Buettner and associates (1996) include in their study the following components of the NDSP: Sensory Air Mat, Sensory Stim Box, Geri-Exercise to Music, Sensory Cooking, Build Your Own Games, Special Event Preparation, and Sensory Special Events. Different components are used with different NDSP subgroups depending upon their level of cognitive and overall functioning. The other treatment program is a traditional long-term care unit program where the main goal is often attendance (Buettner, 1995). The schedule of activities set up for the study includes some activities new to the participants as well as previously experienced entertainment, social, and diversional activities. The new components are: Sensory Stimulation, Sewing Club, Ceramics Group, Adapted Bingo, and Table Games, Sports and News, Morning Orientation, Chair Exercise, Arts and Crafts, Birthday Parties, Sing-A-Longs and Rhythm Band (Buettner et al., 1996).

Effects of the programs are evaluated by assessing the participant's grip strength, flexibility, agitation levels, and overall functioning. Two different instruments measured participant agitation (the Cohen-Mansfield Agitation

Survey and the Behavior-section of the Agitation Behavioral Mapping Instrument). Buettner and associates report that the agitation survey has proven validity (.88 - .93) and a reliability of .92 (Cohen-Mansfield & Rosenthal, 1990, as cited in Buettner et al., 1996). To test overall function Buettner and associates use the Timed Manual Performance (TMP, the "doors test"). They report a validity correlation with actual outcome measure of .95, and an interrater reliability for the test of .98. Grip strength is measured with a bulb-type hand dynamometer (by pounds of pressure), while flexibility is measured with a modified Wells Sit-And-Reach Test (measured to the nearest half inch). Buettner and associates report that the Sit-And-Reach Test has been shown to have a validity of a Pearson product-moment correlation equal to .90, as correlated to the standing bobbing test for flexibility (Meyers & Blesh, 1962, as cited in Buettner et al., 1996).

Pre-test, mid-test, and post-test assessments are conducted with each testing instrument. Data are analyzed with a two-way analysis of covariance, two-way analysis of variance, and multiple regression analysis. Buettner and associates comment that the limitations of the study are in generalizability (sample size of 32 participants; a select population) and questionable objectivity of one measure (one agitation measure was based on nurses' perceptions).

The results of their study show a significant ($p < .001$) positive change in right and left grip strength for one treatment (NDSP) but not for order of treatment. The participants in the traditional program experienced no positive change in right or left grip strength. Flexibility is also shown as a significant ($p < .001$) positive improvement during the NDSP (on treatment not on order). Flexibility scores for the traditional program participants show no positive change. Both grip strength and flexibility scores, for the group receiving the traditional program after the NDSP, declined during the traditional program. Buettner and associates report a significant difference between groups at mid-test and post-test for scores on agitation during the programs; with 50 % less agitation during NDSP than during the traditional program (main effect significant for treatment, $p < .001$; order not significant). However overall agitation is not significantly reduced outside of the program ($p = .08$, as perceived by nurses).

Buettner and associates (1996) use a multiple regression analysis to look into the effects of strength, flexibility, and overall functioning while controlling for cognitive status. This analysis shows a significant relationship between flexibility, right grip strength, and overall function ($F = 32.87$, 3 df, $p < .001$). Since 60 % of variance is accounted for by right grip strength and flexibility they suggest that as the scores on these variables improve the score on overall functioning improves (the TMP measure). A second multiple regression examines the combination of overall functioning and cognitive status on agitation while controlling for score on the pre-test. The analysis reveals a significant relationship ($p < .05$) between a change in overall functioning and overall agitation. Although controlling for pre-test score and cognitive status, the pre-test score on agitation is the most significant control variable ($p < .001$). Buettner and associates say that their model of the relationship of measured variables accounts for 68 % of the overall agitation measured. Therefore they point out that as overall functioning scores improve, measured agitation is reduced.

Buettner and associates (1996) conclude that, participants of enriched activity programs in SCUs, experience much less agitation than participants in a traditional activity program in a SCU. They feel their study provides necessary information on the type of programming needed as well as the type of therapeutic outcomes that can be expected. They suggest that:

- Such programming should include sensorimotor activities that promote free movement.
- People with dementia should have opportunities for successful achievements in the areas of strength and flexibility improvement and agitation reduction.
- The greatest benefits occur when activities are matched to the person's level of functioning.
- Therapeutic outcomes in strength and flexibility should be recognized as relating to the person's functional abilities.

Since the gains in strength and flexibility over the four-week period began to decline when the NDSP was withdrawn Buettner and associates suggest that a well-planned sensorimotor activity program is important for maintaining and (or) improving quality of life for persons with LD.

Buettner (1995) reports on a case study of one of the participants of the Buettner and associates (1996) study. She describes how an 80-year-old woman (Mrs. M) with DAT had been relatively isolated from activity opportunities due to her extreme agitation. Buettner explains how Mrs. M's score on agitation during the four week NDSP drops dramatically, while it rises during the four-week traditional program. She says that Mrs. M shows improved fitness and overall functioning during the NDSP; all of which decline during the traditional program. Buettner (1995) provides a rational for the NDSP, relating that the sensory and motor areas of the brain are not severely affected until the terminal stage of DAT. She says that "[a]lthough some motor abilities are affected in the mid-stages of Alzheimer's disease, the ability to learn new motor skills and relearn old ones seems to be intact" (Buettner, 1995, p. 66).

Cummings (1997) says that many people with DAT exhibit aberrant motor behavior, including pacing, rummaging, rearranging, as well as other stereotyped repetitive behaviors, in the later stages of the disease. He says this behavior may be related to a deficiency in the neurotransmitter acetylcholine (a central feature of DAT), which has variable effects on various brain regions. He explains that "[n]eurochemical changes and interactions between transmitters also are dynamic, change over time, and may account for some variability of neuropsychiatric symptoms [of DAT]" (Cummings, 1997, p. S5). Citing Mesalam (1986) he says that the limbic and paralimbic areas of the cortex contain the highest levels of acetylcholine while the primary motor and sensory cortex contain intermediate levels. Explaining the complex role of the different neural receptors for acetylcholine he implicates these factors in the varying psychosis, agitation, apathy, anxiety, disinhibition, aberrant motor behavior, personality changes, and low rate of depression of people with DAT.

Cummings (1997) also reports on some of the therapies used to treat the cholingeric changes in DAT. These therapies include enhancement of precursors and release compounds, cholinesterase inhibitors that reduce destruction of the acetylcholine in the synaptic cleft of the neuron, and agents that stimulate the neural receptors for acetylcholine. The effectiveness of these treatments varies widely and those that have effect generally produce a broad spectrum of effects (Cummings, 1997). The literature on activity therapies for people with DAT reveals also a broad spectrum of effects and there is a need to understand better what the effective components of all activity therapies for people with DAT are; how these operate, and how to maximize this effectiveness (Rabins, 1998).

Addressing the need to better understand the range of interventions for people with dementia Allen-Burge, Stevens, and Burgio (1999) selectively review behavior interventions aimed at decreasing the challenging behaviors of person with dementia. They categorize the studies into those of interventions for behavioral excesses (disruptive vocalization, wandering, and physical aggression) and those of interventions for behavioral deficits (excess dependency, decreased sensorimotor engagement, and decreased social engagement). Despite their division of intervention goals there remains much crossover of intervention components. For example, the interventions they say address *disruptive vocalization* tend to focus on sensorimotor factors (either soothing or stimulating) with variable cognitive components that are reminiscent of Kovach and Henschel's (1996) findings regarding the value of cognitive ties in stimulating engagement. An example they use in the category of *behavioral deficits* is that persons with excess dependency are shown to be variably responsive to staff behavioral patterns; where interventions in the area tend to target characteristics of individual SCU residents. Further analysis of findings in the category of behavioral deficits shows that once again the effective interventions target sensorimotor components of the resident's behavior with an emphasis on the importance of staff awareness and selection of relevant supportive behavior.

From their review Allen-Burge, Stevens and Burgio (1999) suggest a team approach of integrated care that includes therapeutic activities to increase engagement. Despite their thorough analysis of these behavioral and intervention categories little new understanding of the necessary components of effective therapeutic activities results; therefore an integration of techniques remains important because the dynamics of effective intervention are not well understood. These categories (an analysis of the parts) do not appear to lead toward general principles of the effective components of therapeutic activities. This is an interesting problem and may be related to what Pulsford (1997) points out as key to research in therapeutic recreation for persons with dementia. He says that although there is evidence for therapeutic activities affecting change in mood, behavior, and even cognition (Bleathman & Morton, 1982; Wood et al., 1992, both as cited in Pulsford, 1997; and as Buettner et al., 1996 shows) the effects last generally only for the duration of the activity. This is of course of intrinsic value; but if general principles of what produces these transitory effects can be understood there is further hope for generalizing this understanding to the daily lives of people with DAT. Additionally an understanding of the way the sub-components of these benefits interact may help clarify the direction of research regarding the complexities of the structural and functional changes of the brains of people with DAT.

From this general overview of research on therapeutic recreational activities it appears that the main areas (of these experiences of people with dementia) that contribute to the temporary improvement in the behavior or cognitive function of people with DAT are the sub-components: (1) sensorimotor (physical) activity, and (2) activity with personal (arousal) significance. Therefore this review will look at these sub-components a bit more closely.

Exercise and Movement with Persons with Dementia

Saxton and associates (1997) compare the rate of decline of people with dementia, who reside in a traditional nursing home, with those who reside in a SCU for persons with DAT. They evaluate residents on cognition, general health, problem behaviors, depression, and a broad range of activities of daily living (ADLs) that includes mobility. Saxton and associates use the Functional Independence Measure (Hamilton et al., 1987, as cited in Saxton et al., 1997) to evaluate ADLs because it includes a number of questions related to locomotion and mobility. Although this measure of ADLs was developed for use with person in rehabilitation, the locomotion and mobility aspects are believed by the researchers to be relevant to mobility in the type of facilities in their study (few restraints; available wandering paths). They combine some items on the questionnaire resulting in a 16-item ADL questionnaire. Other instruments they use are the Nursing Home Behavioral Problem Scale (Ray et al., 1992, as cited in Saxton et al., 1997) as an inventory of serious behavior problem; the Cornell Scale for Depression in Dementia (Alexopoulos et al., 1988, as cited in Saxton et al., 1997); the Retrospective Collateral Dementia Interview (Davis et al., 1988, as cited in Saxton et al., 1997) as a comprehensive screening interview of a family member of a resident; and the Mini-Mental State Examination (Folstein, Folstein, & McHugh, 1975). They conduct baseline evaluations with additional evaluations every six months for the following 18 months.

Reviewing this briefly, Saxton and associates (1997) show that although residing in a SCU did not prevent or slow decline in cognition or functional ability of the residents with DAT, it did slow the rate of decline in mobility for those people. In fact the data collected shows no indication of decline for SCU residents on mobility sub-scale scores (0.8%) while for nursing home residents there is a significant decline on mobility scores (25.5%). The main limitation to their findings on this measure is the possibility that the higher baseline scores of the SCU residents contributed to their preserved mobility. The researchers say they are tempted to account for the preserved mobility by the special environmental features of the SCU. According to Saxton and associates the wandering behavior of people with DAT and a facilitative environment likely promote more exercise, better sleep, and less behavioral problems for residents and reduce use of chemical and physical restraints by caregivers. They note that wandering paths are not available to the nursing home residents in their study. These researchers conclude that although the study may not show clear direct effects of a specialized environment, it can be suggested that such an environment may improve quality of life for the residents without slowing the progression of the disease (Saxton et al., 1997). There are a number of studies that look at the benefits of various types of exercise or movement programs for people with DAT. These benefits can be classified generally in categories of physical, behavioral or cognitive benefits. It will be useful then to look at a few studies of exercise and movement activities from the perspective of this classification (physical, behavioral, and cognitive benefits), and then briefly cite neurological research findings. These findings may shed light on some of the neural mechanisms involved in the various benefits from exercise and movement activities.

Activity Studies

Physical benefits. Whereas Saxton and associates (1997) show that physical mobility can be preserved in people with DAT, other studies look at specific types of programs and the physical benefits for people with DAT (Lazowski et al., 1999), or specific benefits of training for physical skill (Dick et al., 1995; Dick et al., 1996).

Lazowski and associates (1999) look into the functional benefits of two different types of group exercise programs for people in long-term care. They conduct this study with a population that is made up of people with various diagnoses. They report that 25 % of the long-term care residents have diagnoses of dementia. Stratifying the participants into two levels of high and low mobility Lazowski and associates randomly assign them to one of two exercise programs. The Functional Fitness for Long-Term Care (FFTC) program and the range of motion (ROM) program each last 45 minutes and are conducted three times per week for four months. To accommodate the different fitness levels the researchers conduct classes for each level in each program. The FFTC program includes progressive functional strengthening exercises, balance-training exercises, flexibility exercises and walking. The ROM program is of the type found in many long-term care facilities. This type of program includes seated range of motion exercises for the fingers, hand, arms, and legs. All participants are assessed prior to and after the exercise programs on tests of mobility, functional balance, gait speed, stair climbing power, functional ability, lower body flexibility, upper body flexibility, isometric strength, grip strength, upper extremity strength, and isotonic strength. The researchers use analysis of covariance on each outcome measure with factors of exercise program (FFTC or ROM) and level of mobility (high or low). Age and baseline scores are identified as covariates. They report the test statistic for comparing the exercise programs after adjustment for mobility level, age, and pretest values. The adjusted scores show that the ROM group, either maintained, made very slight improvement, or declined on, ability in all measures. The FFTC group shows no decline on any measure; and an improvement on mobility, functional balance, lower body flexibility, upper body flexibility, and functional ability. For those categories the F statistics of group comparison are reported as: $F = 4.23$, $p < .05$; $F = 11.23$, $p < .001$; $F = 4.50$, $p < .05$; $F = 6.16$, $p < .05$; $F = 4.17$, $p < .05$ respectively. The researchers conclude that traditional programs are not challenging enough for most residents of long-term care facilities. They say that even the participants with dementia can actively take part with constant cueing, and by mimicking the instructor and other participants. They make the important point that the benefits in functional outcome for participants of the FFTC program are clearly superior to the benefits obtained in a ROM program (Lazowski et al., 1999).

Few studies of exercise programs test people with DAT for long-term retention of acquired skill. Dick and associates (1995) and Dick and associates (1996) are, respectively, studies of long-term retention of fine motor skill and gross motor skill of persons with DAT. Dick and associates (1995) teach a rotary pursuit task (time-on-target) as a fine motor skill, to 12 persons with DAT as well as to 12 persons without dementia (control participants). All participants are randomly assigned to, 40, 80, or 120 trials of training on the task (four participants from each participant group to each training group). Each trial lasts 22 seconds. The 40-trial group receives a set of 40 successive trials on one day. The 80-trial group receives 40 successive trials on two consecutive days and the 120-trial group receives 40 successive trials on 3 consecutive days. Retention of the motor skill is determined by testing on the skill with 15 retention trials 20 minutes, 2 days, 7 days, and 37 days following the end of the training trials. These researchers find that although baseline tracking speed of participants with DAT is significantly lower than baseline tracking speed of control participants ($t\,(11) = 7.34$, $p < .05$; training trials using their respective baseline speeds) repeated measures analysis of variance for each practice condition reveals no statistically significant differences in learning (time-on-target) during training conditions between healthy (control) participants and participants with DAT ($ps < .1$). Analysis of impact of cognitive ability on acquisition of task also reveals no significant differences ($ps < .30$; three categories of cognitive status-normal, mild/moderate, and severe by three practice conditions).

Dick and associates (1995) report similar non-significant effects on analysis of variance for impulse errors between the 40- and 80- trials groups. However, they report a significant difference between control participants, and participants with DAT, on impulse errors for the final 40 trials of the 120-trials set [$F(1,6) = 8.74$, $p = .025$]. For these 40 trials the participants with DAT have significantly more impulse errors than healthy (control) participants. Comparison of mean impulse error with a 2-Group by 3-Practice Condition factorial analysis of variance shows no differences in improvements ($ps < .07$). Again an analysis of impact of cognitive ability, this time on improvement by error reduction also reveals no significant differences ($ps < .20$; three categories of cognitive status by three practice conditions). Regression analyses of cognitive status on learning scores of time-on-target, as well as on impulse error reduction both reveal little predictive value of cognitive status ($r = .23$, and $r = -.361$ respectively).

To determine the extent of retention on the rotary pursuit task Dick and associates (1995) use repeated measures analysis of variance on data from the four retention tests. Analyses are separate, 2-Group by 3-Practice Condition, by

15-Trials comparisons. For the first (after 20 minute) retention trial a significant Group effect is reported [F (1, 18) = 6.53, p< .02] with healthy participants performing better than participants with DAT. Further analysis of mean time-on-target during the last five minutes of learning and three five minutes periods of the retention trial shows that neither group exhibits memory loss of the task skill regardless of group or practice condition (no comparisons reaching significance). Analysis of the second set of retention tests (2 days after learning trials) reveals a significant effect for Trials [F (14, 280) = 4.11, p < .003], which the researchers interpret to mean that both groups of participants improve over the 15 retention trials. The overall results of the repeated measures analysis of variance of the data from the third set of retention tests are nonsignificant. Dick and associates (1995) say that it is clear that both healthy and cognitively impaired participants are able to retain the skill without forgetting for one week.

The results of the repeated measures analysis of variance of the data from the fourth set of retention tests are significant for both Trials [F (14, 280) = 3.24, p < .003] and Trials by Group [F (14, 280) = 32.56, p < .016]. Again the healthy participants outperform the participants with DAT. For this fourth retention test, Student t-tests of the last five learning trials and the three five trial periods of the retention tests, used to determine memory loss of skill, show that both groups exhibit good long-term retention. The researchers say that over the one month period before the retention test the healthy participants seemed to have forgotten somewhat the skill [t (3) = 5.24, p = .0135], however over the five trials of the retention test they quickly relearn the skill. They say the participants with DAT did not exhibit this initial forgetting and surprisingly perform the task better during the final retention test than during the final training trial [t (3) = -.34, p = .0225; across trials 6-10].

Analyses of data of impulse error from the four retention tests show; that participants with DAT made significantly more tracking errors on the first retention test (Group [F (1, 22) = 7.27, p < .013]; that on the second retention test the only significance is for Trials [F (14, 308) = 3.28, p < .001; i.e., with less errors occurring with trials across all three practice conditions and cognitive groups]; that there are no significant results for the third retention test; and that there is a significant effect for Trials [F (14, 308) = 4.34, p < .0002] for the fourth retention test. Dick and associates (1995) conclude that like time-on-target evidence for retained learning, the impulse error data show that both groups of participants are able to retain tracking skill over a month of no practice. They say that all participants show practice effects with significant improvement over the first forty learning trials. Unlike the control participants the participants with DAT maintain but do not improve their performance with additional practice. Further they state that "[c]learly, these findings challenge the common assumption that AD [Alzheimer disease] patients cannot acquire or retain any new information" (Dick et al., 1995, p. 304). Although the speed of the task is individualized (different levels of difficulty) the results are equivalent in the sense that individual participants are learning at the same pace. At a theoretical level the researchers suggest that motor learning is intact in DAT and therefore the structures involved in motor learning and control, such as the cerebellum, basal ganglia and visual, motor, and premotor cortical areas, must be relatively spared in the disease. Practically they suggest that repeated practice on declining motor-based functional skills may improve or prevent further such loss.

A similar study by Dick and associates (1996) looks at acquisition and long-term retention of a gross motor skill in persons with DAT. Specifically they are interested in acquisition and retention of the skill under constant and varied practice conditions. They say Schmidt's theory of motor learning (1975, as cited in Dick et al., 1996) proposes that variable rather than constant practice produces superior learning. This theory presents that due to children's smaller repertoire of well-learned movements variable practice will lead to better motor schemata (the relationship between sensory-motor parameters, memory, and consequences). These researchers say that others have suggested this model to be useful for persons with DAT, who have deterioration in motor schemata or deterioration of access to motor schemata needed for daily activities.

Dick and associates also present an alternative theory, which involves an episodic memory algorithm (that eventually becomes a long-term memory based performance) enhanced with practice and continual comparison between performance and memory (Logan, 1988, as cited in Dick et al., 1996). Since the hippocampal brain structure involved in encoding, storage, and retrieval of episodic memory is significantly damaged in DAT, Dick and associates (1996) suggest that if Logan's theory is correct, the necessary automatic encoding and comparison would make variable practice an ineffective method for learning by people with DAT. Further they say that with *constant practice* multiple comparisons are not necessary and the same learned motor program can be rerun without input from the hippocampus. Referring to related research they note that rats with hippocampal damage are able to learn successfully a water maze escape under constant but not variable practice conditions (Eichenbaum, Stewart, and Morris, 1990, as cited in Dick et al., 1996). They say that damage to the hippocampus might impair only the flexibility of procedural learning rather than the ability. Therefore to better understand this important difference they look at a gross motor skill taught under constant and variable conditions for people with and without DAT.

The Dick and associates (1996) mixed design experimental study includes 28 people with DAT and 24 healthy older people without cognitive impairment. All participants are trained to underhand toss a beanbag to a target. Scoring is according to area of the target the Velcro beanbag adheres to. During 10 consecutive weeks all participants receive two practice sessions per week of 32 trials each (two sets of 16 trials with a short rest between). A pre-test is used to equate difficulty across participants. Distance to target is changed to equalize difficulty of task and achieve baseline scores. For either practice condition the researchers find that participants with DAT need to stand significantly closer to the target [practice condition, t (21) = 7.84, $p < .0001$; variable condition, t (20) = 5.16, $p < .05$]. Once baseline distances are established, 64 pre-test trials are given over a period of two days. For the constant practice condition all tosses during practice and post-tests are done from the baseline distance from target. For the variable practice condition all practice tosses are done from four distances surrounding the baseline distance (two closer and two farther with order randomized), while all post-tests are done from the baseline distance. Three post-test of 64 trials each, across two days, are conducted with each participant (first post-test within 4 days of practice ending; second post-test within one week of the first post-test; third post-test one month after second post-test). All practice sessions and post-tests are; conducted with individual participants using three different targets; controlled for experimenter effects; and designed to create a similar motivating environment for participants in both constant and variable practice conditions.

Dick and associates (1996) use a mixed factorial analysis of the means of the pre- and post-test scores for the two practice conditions of the two groups of participants. Their results show a significant effect for Test [F (3,123) = 71.7 $p < .0001$]; two-way interactions of, Group by Type of Practice [F (1,41) = 4.10, $p < .05$], Group by Test [F (3,123) = 3.32, $p < .05$], Test by Type of Practice, [F (3,123) = 4.34, $p < .01$]; and a three-way interaction of Group by Type of

Practice by Test, [F (3,123) = 5.13, $p < .01$]. They say this analysis shows that the different practice conditions affected the each participant group differently. Specifically, variable practice enables healthy participants to perform as well or better than healthy participants who receive the constant practice condition (but not statistically significant), while participants with DAT show the opposite result. This result for participants with DAT is statistically significant with those participants receiving the constant condition receiving higher scores. The researchers, to clarify the differential effects of the two types of practice on the two groups of participants, conduct further analyses.

These researchers conclude that people with DAT can acquire and retain gross motor skills as well as healthy older people; however this learning is specific to the practice conditions for people with DAT (Dick et al., 1996). Although both groups can learn equally well within constant practice conditions, people with DAT show a significant lack of improvement with a variable practice condition as compared with their healthy peers. Regarding Schmidt's theory of motor learning Dick and associates (1996) say their study does not support greater retention by healthy adults with a variable practice condition. These researchers speculate that this finding, may be either a result of the research design (lack of novel task), or may reflect already well-developed schemata in adults. Their results seem to support Logan's theory of that hippocampal damage impairs memory encoding and storage, while allowing individual memory representations (of procedural memories) that can be accessed when original learning conditions are replicated. They say that other considerations of their results regard discrete (closed) motor skills such as the tossing task verses continuous (open) motor skills such as a rotary pursuit task (Dick et al., 1995). They mention that this difference of type of task may influence which type of practice condition is most effective. Summarizing they state that people with DAT "...have the potential to relearn basic activities of daily living involving a significant motor component....[and]...motor-based interventions have the potential to benefit even severely impaired individuals with functional deficits" (Dick et al., 1996, p. P110). Although these last two studies (Dick et al., 1995; Dick et al., 1996) are not technically studies of activity programs they inform readers that motor learning or relearning (with retention) is possible for people with DAT. Therefore this present study is considered with the idea that motor base intervention is a viable method for activity engagement of people with DAT.

Behavioral benefits. Exercise and movement activities with persons with DAT have behavioral benefits such as a decrease of inappropriate behaviors (Meddaugh, 1987, as cited in Beck et al., 1992), a decrease of agitation (Namazi, Gwinnup & Zadorozny, 1994) and a decrease of wandering and aggression (McGrowder-Lin & Blatt, 1988). Some researchers report various cognitively related benefits of exercise and movement (McGrowder-Lin & Blatt, 1988; Meddaugh, 1987, as cited in Beck et al., 1992).

Beck and associates describe a study of exercise (with music and positive reinforcement) for people with DAT who are aggressive (Meddaugh, 1987, as cited in Beck et al., 1992). This program ran three times per week for nine weeks. They report increased interaction among group participants, improved ability of participants to follow direction, and the elimination of some of the inappropriate behaviors (swearing).

Namazi, Gwinnup, and Zadorozny (1994) also conducted a study of the impact of an exercise program on the adverse behaviors of people with DAT. In this study these people participate in a 40-minute mid-afternoon program of exercise and movement for a total of 28 days. For the same period of time a control group participate in a nonphysical social activity program that included reading and poetry. Observations of participants' agitated behaviors were recorded 24 hours per day for four weeks. The researchers made use of both trained college students and care unit staff for this. A modified Cohen-Mansfield Agitation Inventory (Cohen-Mansfield & Billing, 1986, as cited in Namazi, Gwinnup & Zadorozny, 1994) is used to measure agitation. A reliability check for selected items indicates similar overall patterns of correlation with the Pearson product-moment correlation less than .77 ($p < .001$). They conduct analyses with Student-*t*-tests to compare the groups on differences in means for variables of age, length of stay at the centre, agitation and MMSE scores. They analyze for their hypothesis with chi-square tests to compare the number of agitated behaviors observed for the experimental and control groups.

Namazi, Gwinnup & Zadorozny's findings show a decrease of agitated behaviors for the participants in the experimental group and an increase of agitated behaviors for the participants in the control group with a significant chi-square statistic for group comparison ($\chi 2 = 97.90$, $df = 1$, $p < .001$; Cramer's V = .23). The researchers say that some of this group difference can be accounted for by differences in disease severity, lack of interest, duration of residency and other physical and psychological problems of the participants. The MMSE scores analysis shows no significant changes in cognition by participants. Although this study is small in sample size, and lacks a randomized assignment to groups, and therefore cannot be generalized, the researchers say the aim of the study is to test the adaptability and degree of compliance of persons with DAT to the exercise and movement program. The protocol and components of the program are carefully and thoroughly outlined in the report.

McGrowder-Lin and Bhatt (1988) found that a combined 30 minute simple exercise and 60 minute refreshments, dancing and cool down exercises program decreased wandering and aggressive behavior in all (five) participants with DAT. Additionally these participants seemed to show qualitative improvement in cognitive functioning such that they were able to take part in higher functioning activities (i.e., a boat ride and restaurant outings) and sustain active participation for up to 30 minutes; both being behaviors they were unable to perform before the intervention. The researchers also report a significant (60% of the time) improvement in bowel and bladder control for one resident. Other benefits of the program are cited as; less inappropriate removal of clothing; the seeking out of other participants during non-program time; weight gain due to improved appetite and improved self-feeding; and cognitive improvements noted by a participant's family.

Cognitive benefits. A few of the previously cited studies of the physical and behavioral benefits of exercise and movement activities allude to some element of cognitive benefit for people with DAT (Dick et al., 1995; Dick et al., 1996; McGrowder-Lin & Blatt, 1988; Meddaugh, 1987, as cited in Beck et al., 1992). The following studies of two very different exercise programs each look directly at the cognitive benefits of these programs for people with DAT. Maintenance of these cognitive skills is noted as very important for holding back further cognitive decline that results from inactivity, immobilization, and sensory deprivation (Palleschi et al., 1996).

Friedman and Tappen (1991) compare a walking program for people with DAT to a communication program for people with DAT. Their walking program is a planned walk and conversation for individual participants and the investigator (30 minutes three times per week for 10 weeks). The conversation program functions as the control group where a group of participants and the investigator converse but do not walk (30 minutes three times per week for 10 weeks). Preand post-intervention measurements are made on two communication scales. Friedman and Tappen report that the walking group showed substantial improvement on both scales while the conversation group showed a small decline on one scale and a small improvement on the other scale. These researchers conclude that this walking program can improve the cognitive function of the participants with DAT.

Palleschi and associates (1996) look at long-term cognitive changes in 15 men with DAT who take part in a three-month aerobic exercise program. The male participants in the study are in an early stage of DAT with scores of 18-21 on the Mini-Mental State Examination (MMSE, Folstein, Folstein, & McHugh, 1975). Prior to the exercise program the participants are given a series of neuropsychological tests of attention matrix, verbal span, and supraverbal span, as well as the MMSE. In this study the exercise program consists of training with a cycloergometer three days a week for three months. Participants monitor and maintain their heart rates at approximately 70 % of their maximal pulse frequency. The investigators increase the muscle loads on a participant until the established heart rate is achieved. Each participant is encouraged to maintain this rate for 20 minutes. At the end of the three-month training period the series of psychometric tests are again given to each participant. Statistical analysis is done with analysis of variance.

Palleshci and associates (1996) report the pre- and post- means and standard deviation for the four cognitive tests. All four tests show significant improvement ($p < .0001$) on the test criteria. The researchers conclude that aerobic training may improve significantly cognitive functions of people with DAT. They add that there are other indirect benefits of such an exercise program. They say that loss of cognitive ability leads to progressive immobilization, isolation, sensory deprivation, and further cognitive impairment. Palleshci and associates state that their study looks at 'long-term effects' as opposed to the transitory effects that are measurable immediately after a single exercise session.

Neurological Evidence

This section of the review is included to provide some supporting evidence for this relationship between exercise and cognitive functions. The research cited presents one possible way human exercise and movement affect cognitive function; ultimately by affecting the neurotransmitters of the brain. The main focus of this short review is the neurotransmitter dopamine, which is implicated in many higher cognitive functions (Previc, 1999) and is also shown to decline with aging (Gabrielle, 1996; Volkow, 1998).

Chaouloff (1989) reviews the experimental literature regarding physical exercise and brain monoamines (neurotransmitters which include dopamine, noradrenaline, adrenaline, and seratonin). He concludes that there is strong evidence to suggest that exercise and mental health are closely linked. Sutoo and Akiyama (1996) state that it is well known that exercise produces a 'refreshing feeling'. Their studies investigate the effect of exercise on the calcium-calmodulin-dependent dopamine synthesis in the brain. The animal experiments they conduct show that exercise increases the level of calcium in the brain, which enhances synthesis of brain dopamine. This increase in dopamine, they say, modifies and (or) affects brain function that may have associated physiological, behavioral, and psychological changes. They add that exercise dependent changes in other neural pathways have yet to be thoroughly investigated. Sutoo and Akiyama refer to a previous study of theirs, to note that cold stress has similar actions on brain function (Sutoo, Akiyama, & Takita, 1991 as cited in Sutoo & Akiyama, 1996). A full-length review by these researchers reports again on exercise induced calcium-dependent dopamine synthesis in both animal and human studies (Sutoo & Akiyama, 1997). In this article they explain how exercise can lead to increased dopamine levels, which are associated with behavioral and psychological changes, as well as induces physiological changes such as a decrease in blood pressure.

Looking at healthy people between the ages of 24-86 Volkow and associates (1998) conducted a positron emission tomography (PET) scan study to assess the condition of one dopamine receptor (D2 receptor) in the brain, in association to a neuropsychological test battery sensitive to dopamine alterations due to neurodegenerative disease. The results show that with increasing age, the areas of the brain, known as the caudate and putamen, have a decline of receptivity to a marker for the D2 receptor [caudate, $r = -0.62$, *df* (28), $p < 0.0003$; putamen, $r = -0.70$, *df* (28), $p < 0.0001$]. Age also correlated significantly with scores on many neuropsychological tests. They report a partial correlation analysis to control for age effects. This analysis shows a specific relationship between dopamine measures and performance on the dopamine-sensitive tests. Further factor analysis and stepwise regression analysis isolates the factors that contributed to most of the variance on significant tests (Finger Tapping Test; Wisconsin Card Sorting Test; Stroop Color-Word Test; Raven Standard Progressive Matrices; Symbol Digit Modalities Test).

These researchers conclude that changes in motor and cognitive functions are associated with the decrements in brain dopamine activity that occur with aging. They note that while this decline in dopamine is not accompanied by neurological dysfunction in healthy people, it nevertheless leads to some loss of motor and cognitive (particularly frontal lobe) function. Since their analysis partials out the effects of age, they say the remaining significant correlation suggests that dopamine activity may influence frontal lobe cognitive functions regardless of age. Reviewing the evidence for the role of dopamine in six cognitive and motor functions, Previc (1999) firmly establishes the importance of dopamine in the development and maintenance of higher intelligence. He says the six principle skills of the unique human intellect are motor programming, working memory, cognitive flexibility, abstract representation, temporal analysis/sequencing, and generativity (ability to generate new solutions, create and express new ideas or associations). He presents particularly the equivalence of 'mental' and 'motor' skills, pointing out that although each can be viewed as separate capabilities the elimination of any one of these skills would severely degrade the human intellect. Previc (1999) notes that optimal linguistic communication depends upon all six of these intellectual skills. He goes on to explain the additional role of acetylcholine in temporal perception, temporal sequencing, long-term memory, motor control; and its lack of effect on working memory, and cognitive flexibility (Meck, 1996; Finn et al., 1997; Aigner, Walker, & Mishkin, 1991; Harder, Baker, & Ridley, 1998, all as cited in Previc, 1999).

The effect of a loss of brain dopamine is the subject of much ongoing research of the condition of Parkinson disease (Gabrielli, 1996). The different types of memory losses associated with Parkinson disease, DAT, and normal aging, are looked at in a comparative study by Gabrielli (1996). Gabrielli concludes that the cholinergic mediated areas of the frontal lobe system of the brain (conceptual rather than perceptual memory) are well known as areas damaged by DAT, along with temporal-medial declarative memory areas, while the dopaminergic mediated areas of the frontal lobe system (strategic memory) are affected by Parkinson disease. Further to this he states that late onset of DAT affects the medial-temporal area of the brain (declarative memory) while, as also noted by Volkow and associates (1998), normal aging appears to have a continuous effect on the area of the frontal lobes mainly implicating strategic memory but leaving conceptual memory intact. Even this very short synopsis of Gabrielli's findings is enough to point to the compounding effects of DAT and normal aging where both the cholinergic mediated conceptual memory and the dopaminergic mediated strategic memory are at risk. Keeping in mind Palleshci and associates (1996) point regarding the circular effects of loss of cognitive functions with the resulting isolation and sensory-motor deficits, the implications of a progressive loss of both declarative and strategic memory do seem devastating.

This evidence of the decline in the six principles skills of human intellect (Previc, 1999; Volkow et al., 1998) combined with the gradual loss of conceptual memory (Gabrielli, 1996;) presents a strong case for the variable and profound development of DAT where loss in one area may compound losses in the other. However, research into the effects of exercise on the cognitive functioning of persons with DAT (Friedman and Tappen, 1991; McGrowder-Lin and Bhatt, 1988; Palleschi et al., 1996) and evidence of behavioral benefits of exercise for persons with DAT (Meddaugh, 1987, as cited in Beck et al., 1992; Namazi, Gwinnup & Zadorozny, 1994; Saxton et al, 1997) suggest that some aspect of decline during DAT can reverse with exercise. Other research suggests that exercise stimulates synthesis of dopamine (Sutoo & Akiyama, 1996), which may enhance the higher cognitive functions associated with the dopaminergic pathways of the frontal lobes (Previc, 1999). Research by Lazowski and associates (1999) points to the fitness benefits of a challenging exercise program while Dick and associates (1995) and Dick and associates (1996) provide research findings that persons with DAT can acquire and retain motor skills.

In summary there is experimental evidence for a wide range of benefit from exercise for people with DAT. The research supports that many different benefits of exercise programs exist and these physical, behavioral and cognitive benefits are of great importance to the lived experience of persons with DAT. There seems to be reasonable evidence to consider that the physical movement seen in exercise activity provides one component of the experience and maintenance of what Kitwood (1997) defines as personhood.

The Importance of Emotional Responsiveness in Therapeutic Recreational Activities for Persons with Dementia

Magai and associates (1996) say that although the cognitive and functional symptoms of DAT have received a great deal of research attention, the emotional aspects of the disease have gone relatively unexplored. Passive behavior in people with DAT has been identified as involving a reduction of emotionality (Colling, 1999). Many studies support the need of people with DAT for emotional and meaningful activities (Callanan, 1994; Locke Gibson, 1994; Johnson, Puracchio Lahey, & Shore, 1992; Morgan & Stewart, 1997; Sterritt & Pokorny, 1994; Wald, 1983). There also exists a diverse body of neurologically based research supporting a role for emotional arousal (McGaugh et al., 1993), attention (Graf et al., 1990), and conscious awareness (Perry et al., 1999) on the maintenance of personal and social functioning. Daffner, Mesulam, Cohen, and Scinto (1999) clarify much of this related research with their studies looking at the drive toward novelty. They show that the drive toward novelty, which can be diminished with dementia, may relate to an attention or discrimination deficit that in turn may be responsible for much of the apathy seen in people with DAT.

In their study, Magai and associates (1996) explore the emotional responsiveness of people with mid- to late-stage DAT. They hypothesized that people with DAT would retain the ability for emotional expression and that declines in this ability would not follow declines in cognitive-functional abilities. The study involves 82 people with DAT, some of their family members and nursing aide caregivers. Two questionnaires as well as one observational report are completed for each person with DAT in the study. The questionnaires and observations assess facial expression, and affective behaviors during situations of daily living (five basic emotions of anger, fear, joy, interest, and sadness). Psychological assessments result in four groups of cognitive levels, which are used as the independent variable for the one-way analysis of variance statistical tests with the two questionnaires and the one direct observational assessment. The cognitive groups are labeled one to four with Cog Group 1 including persons with the least cognitively impairment and Cog Group 4 including persons with the most cognitively impairment. Significance of group differences is determined using tests for least squares differences.

Magai and associates (1996) say their results support both points of their hypothesis; first, that emotionality is retained and second, that emotionality is not necessarily tied to cognitive-functional declines. They report three specific categories of analysis. First regarding the facial expressions of emotion by participants with DAT during family visits as a function of cognitive function they find that a “knit brow” expression is significantly greater at the stages of lower cognitive functioning [F (3, 43) = 13.82, $p < .0001$; Cog Group 1 > 3,4]. They note that “knit brow” is a sign of effortful cognitive processing rather than an emotion. In this first category they also report a significant effect of Cog Group level for joy [F (3, 43) = 2.4, $p < .05$; Cog Group 1 and 2 > 4]. They say this finding shows that for only the late-stage of DAT a decline of joy occurs while there are no cognitive group differences for sadness, anger, interest, and contempt. Magai and associates (1996) note that for all cognitive groups the facial expression of “sad” occurs during the last two minutes of the interaction; suggesting that even in the latest-stage of DAT people are aware of the imminent departure of their relative and are saddened by it.

The second category of analysis compares family rating of participant’s emotion (via questionnaire) to the previously cited analysis of facial expressions as a function of cognitive level. With this analysis they find a significant effect of Cog Group for interest [F (3, 37) = 3.90, $p < .02$; Cog Group 1, 2, 3 > 4]. They say this indicates that families continue to see an expression of interest in their family member with DAT up until the late-stage of the disease. A similar effect is reported for joy [F (3, 39) = 3.61, $p < .02$; Cog Group 1, 2, 3 > 4]. Therefore, of the five facial expressions (interest, anger, contempt, sadness, and joy), only two (interest and joy) are seen by the family members as decreasing; and only during the late-stage of DAT. This analysis is repeated, but with the questionnaire data from the aide or caregivers. Similar to family assessments, aides see a decline of interest in early-stage (not late-stage) of DAT [F (3, 54) = 6.30, p not reported; Cog Group 1 > 2, 3, 4]; a decline of joy during the late-stage of DAT [F (3, 57) = 2.74, $p < .05$; Cog Group 1 > 3, 4]; and unlike family assessments, a decline of sadness between mid- and late-stage DAT [F (3, 59) = 2.0, $p < .05$; Cog Group 1 > 2, 4].

Reviewing the inter-correlations between the family and aide questionnaires Magai and associates (1996) note that only the ratings for joy achieved significant association ($r = .43$, $p < .03$). However the family ratings of participants' emotional expression do correlate on three ratings with the objectively coded observations of facial expression (interest, $r = .31$, $p < .04$; anger, $r = .61$, $p < .001$; and joy, $r = .41$, $p < .03$). Correlation analysis of facial expressions to aides' ratings on questionnaire is significant for interest ($r = .36$, $p < .05$) and joy ($r = .56$, $p < .0009$). The researchers account for discrepancies between the correlations of family to aides' ratings by the context of the facial expression observation (during a family visit). When joy ratings are adjusted for social situation families noted more joy in their family members than aides did (t =3.38, p = .002). The researchers say this is likely due to the family member visit being the cause of the participant's happiness. This 'presence' situation is also the likely cause of aides rating participants as more angry than family members do (t = .88, p = .008) because aides are involved in many care giving situations such as bathing and toileting that family members are not.

Despite this variability Magai and associates (1996) say that it is clear that people with DAT have the ability for and display emotional behavior, even in the later stages of the disease. Particularly they state that these emotional expressions do not vary as a function of the stage of the disease; at least not in the mid- to late-stages. Citing other research into emotional and cognitive information processing Magai and associates suggest that the information processing abilities of people with DAT may have been underestimated. They consider that this may be due to the compromised motoric and linguistic abilities of people with DAT, which mask these people's true level of comprehension. Regarding treatment implications Magai and associates suggest that the blunting of affect in persons with DAT may be due to the lack of social stimulation found in institutional settings. Citing Magai and McFadden (1995) they say that "...linguistically impaired dementia patients may suffer the same fate as prelinguistic infants who, when neglected or exposed to nonresponsive caregivers, show a rapid decline in their expressive behaviors" (as cited in Magai et al., 1996, p. 393).

Reviewing the research on passive behavior exhibited by persons with dementia Colling says that passive behavior is often mistaken for depression, and as cognition declines passive behavior tends to increase (Rubins et al., 1987, as cited in Colling, 1999). Additionally Colling states that research shows an inverse relationship between passive behavior and functional abilities (Doody et al., 1995; Gilley et al., 1991, both cited in Colling, 1999). Although there are no comprehensive assessment instruments for passive behavior in dementia Colling cites a list of associated behaviors: (1) reduced cognitive abilities, (2) reduced emotionality, (3) reduced interaction with individuals and environment, and (4) reduced psychomotor activity (Colling, in press as cited in Colling, 1999).

Colling says that interventions targeting passive behaviour may need to provide a balance, between rest and activity, which is specific to the stage of dementia. She suggests interventions such as reminiscence, movement or music therapy, pet therapy, and therapeutic recreation activities as potentially suitable for tailoring to individual needs. She adds that engagement in meaningful, functional activities is important for people with dementia as it encourages meaningful cognitive activity to be attached to sensory input. Colling (1999) suggests that during the late stage of dementia the use of therapeutic touch and a calm pleasant voice can promote trust and engagement into activities. Similarly Beck (1998), reviewing psychosocial and behavioral interventions for persons with DAT, promotes the use of recreational, sensory stimulation with people with late-stage dementia. Beck (1998) adds that art therapies can be helpful as they are a nonverbal means of releasing emotions and integrating past experience (also see Callanan, 1994; Locke Gibson, 1994; Wald, 1983).

Additionally a study by Morgan and Stewart (1997) supports the use of sensory and meaningful stimulation with people with DAT. In a report on the qualitative aspect of their study that looks at the importance of the social environment to the care of persons with dementia, they express that optimal stimulation and meaningful activity are major themes of their findings (Morgan and Stewart, 1997). They find that the physical environment cannot compensate for the deficiencies of the social environment. About this they say:

> Participants also described residents' need for love. This was met through verbal and physical contact with staff. People with dementia were seen as needing love and nurturing even more than others because they lose the ability to meet their emotional needs on their own (Morgan & Stewart, 1997).

Individualized care is also a major theme of their study, which relates to the need for stimulation and activity. They say that although there has been little empirical research on stimulation and meaningful activity the literature supports their findings of the importance of these areas. Morgan and Stewart (1997) conclude that more attention should be paid to developing a supportive social environment for persons with dementia. This suggestion addresses Colling's

(1999) observation that caregivers often do not notice passive behavior and there is the possibility that people with dementia and passive behavior receive less caregiver attention.

Activity Studies

Sterritt and Pokorny (1994) developed a clinical intervention that integrates nursing concepts, and principles of art therapy and group dynamics. They studied their intervention to determine whether art activities can benefit persons with cognitive impairment. These eight participants with cognitive impairment were all, but one, over the age of 65 years and all attended a day program at a psychiatric hospital. The cognitive impairments of the participants were the result of DAT, multi-infarct dementia, Parkinson disease, schizophrenia, etceteras. All eight participants engaged with the art activities as a group for one-hour sessions. Sterritt and Pokorny do not report how often these sessions occur, how long the intervention study lasts, or at what point in the study observation and interviews are conducted. However they do say that observational data includes:

- Willingness or desire to participate.
- Focus of attention (duration and intensity).
- Expressions of pleasure (smiling for example).
- Interaction with the group

They add that the data from interviews includes:

- Comments and attitudes expressed regarding the activity.
- Feelings generated by the activity.
- A desire to repeat the activity (Sterritt & Pokorny, 1994)

These researchers identify three main, emergent themes from the intervention. First they say that the art activity is especially useful in stimulating reminiscence with both verbal and nonverbal participants. They say also that the art activity stimulates the participants to express their feelings; most often depression, loneliness, and loss, although feelings of difficulty in daily life situations of home and relationships are mentioned. The third theme, which emerges, is that the art activity increases interaction among group participants. Sterritt and Pokorny (1994) conclude that the experience of "flow", greater control, self-knowledge and increased group interaction are all benefits of art activities for elderly persons with dementia.

Johnson, Puracchio Lahey, and Shore (1992) present a report of their use of creative arts therapies in a SCU for people with DAT. Within a group framework they identify a variety of creative arts therapies, stating that these nonverbal activities draw on sensory and affective experiences, which can encourage reminiscence, self-expression, and socialization. They make use of music groups, visual art therapy, and movement therapy to provide people with DAT the opportunity to engage specifically in the creative process. According to Johnson, Puracchio Lahey, and Shore this creative component provides a flexible means of self-expression. "In essence, the creative process may provide an opportunity for the lost self to emerge by fostering spontaneity, by recreating social roles, by focusing on remaining strengths and by giving shape to affective communication" (Johnson, Puracchio Lahey, & Shore, 1992, p. 272).

Neurological Evidence

McGaugh and associates (1993) review extensive evidence for the influence of emotional arousal on memory storage processes. The review of these studies, many from their laboratory, point to the brain structure known as the amygdala as a site of processing rather than storage. Their conclusion is based on key, replicated research findings: (1) lesions of the amygdala do not block learning and retention of emotionally arousing tasks, but (2) lesions of the amygdala and stria terminalis (a related area of the brain) do block the effects of drugs and hormones known to affect related neuromodulatory systems. Thus they say that although the amygdala is not required for either the acquisition or long-term storage of emotionally aroused learning, it appears to influence such learning through interactions of noradrenergic, opiate, and GABAergic systems. McGaugh and associates (1993) say these systems converge on the amygdala regulating the release of norepinephrine, which mediates the release of acetylcholine in brain areas for memory storage. A review of this and further research in this area by McGaugh, Cahill, and Roozendaal (1996) relates both animal and human studies to support the role for the amygdala of modulating long-term memory storage. McGaugh, Cahill, and Roozendaal find that the basolateral nucleus of the amygdala influences the learning mediated by the cholinergic pathways of the hippocampus, as well as the neuroplasticity of the hippocampus—the brain structure strongly implicated in DAT (Perry, Walker, Grace, & Perry, 1999).

Perry and associates (1999) present current research regarding the modulatory effects of the cholinergic system on selective attention. They find that psychopharmacological and pathological evidence supports the view that the cholinergic systems are involved in conscious awareness. They say the hypoactivity of these cholinergic projections to the hippocampus, seen in DAT, is associated with loss of explicit memory, rather than implicit memory. Explicit memory, like declarative memory, involves learning of which the person is aware, unlike implicit (related to procedural) memory of which the person is basically unaware (Perry et al., 1999). They say that "...it is not so much information storage and retrieval *per se* that are primarily compromised in AD [Alzheimer disease], and that 'cholinergic correlates' of cognitive impairment might instead be correlates of the degree of unawareness experienced by the patient" (Perry et al., 1999, p. 275). They add though that deficits in the cholinergic pathways are unlikely to be the only impairment in DAT. To account for the variable and extensive cognitive and non-cognitive symptoms of the disease they say other impairments are likely. Specially they point out that in diseases such as Parkinson disease and dementia with Lewy bodies, which are less complex than DAT, the neocortical deficits of the cholinergic pathways are generally greater than in DAT; although the cognitive impairment in persons with DAT are much more severe than in the other two diseases (Perry et al., 1999). In conclusion they comment that the disturbance of conscious awareness has for some time been seen as a major predictor of personal and social dysfunction. They suggest that aside from the current objective measures of cognition, memory, and behavior an exploration of subjective experiences, which involve conscious awareness, will enlighten our understanding of the influence and action of acetylcholine in the human being. They say research as to the interactions between acetylcholine and GABA and glutamate (other neuro-chemicals) may provide further insights.

Certainly research on the conscious awareness of people with DAT is sparse. There is some earlier research that looks at the existence of attention deficits in persons with dementia, which unlike memory deficits has not been the focus of extensive research. A deficit of attention, in persons with DAT is the subject of a series of research studies by Graf, Tuokko, and Gallie (1990). Linking attention and memory they state that, "[t]o remember a particular event, the subject must be able to focus and sustain attention, process (i.e., attend to) features that distinguish it from other events that may be distracting, while attending to concurrent activities" (Graf, Tuokko, & Gallie, 1990, p. 528). Thus memory and attention are closely aligned. They feel that an understanding of attention deficits will provide better understanding of the memory dysfunction in persons with DAT. As well they say that the performance of persons with DAT in domains such as language and social interaction could become more understandable with further insight into attention deficits. Although using different terminology Graf, Tuokko, & Gallie seem to be referring to the link between attention and explicit memory which Perry and associates (1999) implicate in conscious awareness.

In one of the studies by Graf, Tuokko, & Gallie (1990) the findings show a significant difference in memory recall for self-performed tasks (SPT) versus experimenter performed tasks (EPT) of persons with dementia, as compared with control subjects; the subjects with dementia recalling SPT better than EPT. The researchers propose that higher recall for a SPT occurs due to the SPTs involving more attention to the components of the task, which ensures better neural encoding. Thus they say that attending to critical task components is necessary for organized encoding into memory. They suggest that observation does not guide attention to critical task components and the person must rely upon self-initiated processing. This comment suggests that physical action may be an important component of attention. To perform about equally well on observed tasks as on previously performed tasks, models of emergent neural patterns (McCrone, 1999; & Calvin 1996) appear to show that the observed tasks may be connecting to previously learned patterns lying dormant in the brain.

Relating additional research on attention and novel interest McCrone explains that a sharp focus of conscious attention has been shown to be a result of novel tasks that require involvement of the pre-frontal lobe of the brain (Passingham, as cited in McCrone, 1999). Tasks that have been previously learned, for which a similar pattern exists, will not activate this neural area and so do not stimulate the heightened quality of conscious attention. During the experiments by Graf, Tuokko, & Gallie (1990) the recall performance of persons with dementia on a self-performed task may then be a result of the increased attention to the task (possibly stimulated by the novelty of the physical involvement). This stimulation of the pre-frontal cortex may be creating new short-term memory, and so better recall than for observed only tasks. On the other hand, the findings of Graf, Tuokko, and Gallie (1990) may reflect the findings of Dick and associates (1995) and Dick and associates (1996) of the well-retained ability of persons with DAT to learn motor skills through practice.

Daffner, Mesulam, Cohen, and Scinto (1999) use an experimental design to study this issue of novelty-seeking behavior in people with DAT. They include 17 participants with DAT and 13 age matched control participants in their study. The participants all complete a personality and behavioral questionnaire; take part in a session of experimental tasks, memory tests, and bedside neuro-opthalmological examinations. Since previous research (Daffner et al., 1992, as cited in Daffner et al., 1999) has shown people with DAT can be differentiated into groups of 'indifferent to novelty' and 'curious of novelty' the participants with DAT in the study by Daffner and associates (1999) are divided into groups along that protocol. The two experimental tasks are briefly: (1) Curiosity Figures Task consisting of ten pairs of stimuli where one stimulus is a regular or congruous figure and the other figure of the pair is irregular or incongruous. The participants view the figures under an unstructured and spontaneous condition and then under a structured condition. For the unstructured condition eye movements are recorded with the main dependent variable being the portion of dwell time. The figure displays are divided into areas of interest. Only the participants with DAT are tested under the structured condition, where participants are asked to identify novel stimuli; (2) Saccade-To-Target Task consisting of a fixation, novel appearing stimuli, and appearing letter (X or O). In this task, only for participants with DAT, the dependent variables are percentage of correct trials (saccade in direction of the target) and saccade latency for all correct trials. Various statistical tests are performed on the data.

Daffner and associates (1999) report no statistical difference in severity of dementia between the group of participants with DAT who are indifferent and those who are curious. Analysis of the relationship between indifference and curious to the personality and behavioral inventory show statistical difference between the groups on items: lack of initiative ($p < .05$); lack of motivation ($p < .05$); for an Apathy Summary Score difference ($p < .05$): where curious participants with DAT score higher than participants with DAT who are indifferent. There is no significant difference between the groups of participants with DAT in their ability to accurately identify the more novel stimulus; nor is there difference between those groups on both Saccade-To-Target Task measures.

Important differences between all three groups occur with the patterns of eye movements measured by first fixations and following temporal intervals (0-3, 0-6, and 0-12 seconds). The normal, control participants direct their first fixations significantly more often toward incongruous stimuli ($p < .05$), and less often to neither stimulus ($p < .01$) across all temporal intervals as compared to both groups of participants with DAT. The participants with DAT who are indifferent show no significant difference on dwell time on incongruous versus congruous stimuli during any temporal interval. The normal, control participants differ from participants with DAT who are indifferent with more time on incongruous stimuli and less on neither stimuli for first fixation ($p < .03$) and more time on incongruous stimuli and less on congruous stimuli across all temporal intervals ($p < .05$). There is no difference between the participants with DAT on their distribution of first fixations or percentage of dwell time on all stimuli in the 0-3-second interval. In the other two intervals (0-6 and 0-12 seconds) the participants with DAT who are curious spent significantly more time on incongruous stimuli ($p < .05$) and significantly less time on neither stimuli ($p < .05$) than participants with DAT who are indifferent.

Regression analysis is used by Daffner and associates (1999) to examine the percentage of time each group spent on the different stimuli. They say that the normal group shows an orderly pattern of eye movements and gaze preferences over all temporal periods (*p*s = .02 to .001). Participants with DAT who are indifferent show a very different pattern where percentage of time on all stimuli during the first or second 3 seconds (of temporal periods) does not significantly correlate with the percentage of dwell time spent on blocks of seconds in subsequent periods. Participants with DAT who are curious also show less predictability of eye movement over time than those in the normal group where only dwell time on the first 3-seconds predicts percentage of dwell time during the second 3-seconds and the final 6-seconds (on neither stimuli, $p = .04$ and $p = .001$, respectively).

Daffner and associates (1999) feel that their experimental approach sheds light on the psychological mechanisms underlying the apathy and disengagement seen in many people with DAT. They say their study provides confirmation that persons with DAT are, as a group, less attracted to novel stimuli than age-matched persons without dementia. They then speculate that this indifference may result from cognitive deficits that make it difficult for the person with DAT to recognize novel stimuli. However they say that this does not fit with the fact that people with DAT who are indifferent can successfully distinguish unusual stimuli when asked to (i.e. achieving 97.5% correct choice on trials of the Novelty Identification Task). This discovery, plus assessments of cognitive decline do not appear to account for their indifference to novelty. Further these researchers say their results are not consistent with a hypothesis that persons with DAT become overwhelmed by novel stimuli and withdraw from or avoid such stimuli.

Daffner and associates (1999) point to a few important differences between participants with DAT who are curious and participants without dementia. The participants with DAT who are curious, in this case, are slower to orient to and focus on novel stimuli, and have an inconsistent pattern of eye movements across temporal intervals. In addition these researchers note that participants with DAT who are indifferent perform better under the structured condition. This suggests to them that people with DAT may fail to direct their *attentional resources* toward objects in the environment. This type of deficit could account for the findings of Graf, Tuokko, and Gallie (1990) regarding significantly better performance on SPT than on EPT by persons with DAT; where SPT depend on 'internal' attention whereas EPT involve attention directed toward the environment.

Reflecting findings by Calvin (1996), Graf, Tuokko, and Gallie (1990), and McCrone (1999) Daffner and associates (1999) refer to the pre-frontal cortex in control of novelty seeking behavior and environmental engagement. They note that much research implicates a variable pathology of the frontal cortex in the early- and middle-stages of DAT. They say that this may account for the two different DAT group (curious and indifferent). They conclude specifically that in people with DAT a 'diminished drive toward novelty' can be differentiated from a 'sustained ability to recognize novel visual stimuli'. Daffner and associates

(1999) suggest an attentional or discriminate deficit rather than a cognitive deficit for apathetic behavior in persons with DAT.

Summary

Research with persons with DAT looking at both physical and creative arts activities points toward the benefits of engagement with, and focused attention on such activities. When attentional or discriminate deficits can be compensated for through enhancing the sensory, physical, and emotional arousal aspects of an activity, and the context of that activity, the research seems to support that there results a reduction of apathetic behavior. Therefore it is possible that this [change in] attentional behavioral may be a key component of the dynamic emergence of personhood. By focusing on the creative process within a subjective and personal context, a creative arts activity may provide the guidance people with DAT need to direct attention to, and discriminate between the relational features that communicate emotional content. The opportunity to communicate such emotional content may enhance experience and promote the probability of new behavior (neural plasticity in the brain) for people with DAT.

Creative Arts Therapies

A common method of working with the symptoms of depression or emotional conflict experienced by persons with DAT is through creative arts therapies (Sherritt & Pokorny, 1994; Wald, 1983). Callanan (1994) suggests that art therapies can assist with discovery of feelings, memories, and personal issues. She says that experience with expressiveness can validate the self and reinforce autonomy. A wider base of emotional communication and broadened personal resources allow for the confronting and resolving of inner conflict. Of special interest for this review, Callanan notes that although cognitive and physical functioning may deteriorate in older persons they still maintain a full range of human emotion. For people with dementia this range of emotion may not receive the necessary opportunities for expression unless these are provided (Morgan & Stewart, 1997; Vittoria, 1998). Callanan (1994) states that it is emotions that embed the arts with creative spontaneity. She says this is why the therapist must take responsibility to provide experiences that access the creative self. She explains that such creative arts interventions should engage and maximize the remaining perceptual and cognitive skills of the participants. The art experience should act as a supportive structure from which can emerge the participant's point of view. Thus the strengths of these participants are emphasized. This encourages authentic response and creative involvement. "Art therapists facilitate the means necessary to enliven the creative process in addition to structuring situations in order to draw out inner material in the form of personal imagery" (Callanan, 1994, p. 20).

Locke Gibson (1994) outlines the nature of art therapy as addressing cognitive and spiritual development, thus helping with physical and mental distress; developing new communication skills; and promoting new learning patterns, which can transfer to other interactions. She says that the satisfaction of developing new skills and new learning can enhance self-esteem and expand identity. Like Taft (1985) Locke Gibson says that self-esteem can help deal with conflicts, depression, and fears. This in turn provides a sense of self-control and self-worth. Locke Gibson states that "[t]he safest medication for spiritual health will be found within the creative arts, music, drama, dance, and poetry, freeing the individual to pursue self-actualization" (1984, p. 47). The creative arts therapies may be the safest and most effective avenue to enhancing attentional awareness in persons with DAT.

Dance Movement Therapy

Explaining the therapeutic process of dance movement therapy (DMT) Pallero (1996) quotes Kapka (1979), "It is through the body-self experience that we come to know what we need: it is through the social-self interactions that we are able to get what we need" (p. 117). Pallero points out that an integrated inner and interpersonal concept of self allows room for different levels of experience. She says that dance movement facilitates this integration of inner self and interpersonal self.

Dance movement accesses the psychotherapeutic process as well as provides the benefits of physical exercise. Leitner and Leitner (1996), citing Weiss (1990), state that the benefits of exercise for older adults include improved coordination, reflexes, agility, body movement, and balance. Leitner and Leitner also say that the feeling of relaxation, which can result from exercise, promotes the release of muscular tension, and psychological stress.

Creadick (1985) citing Feder (1981) says that movement and dance have helped paralyzed limbs move again. Looking at the neuro-physiological basis of the mind-body connection in DMT Berrol (1992) presents a review of evidence to support the idea that rhythmical movement is a biological response. She expresses the belief that central nervous system patterning is responsible for the attribute of rhythm, which is a component of every human movement. She presents that there are both internal physiological factors for rhythmical movement, as well as external factors to which such movement is responsive. She says that,

> ...increasingly validated in the literature is the concept of the reciprocal relationship between motion and emotion—whether a manifestation of body image, a psychic, attitudinal or muscular state—as neurophysiologic correlates. Thus music and rhythmic movement—the most profound ingredients of dance/movement therapy may continue to play significant roles in shaping the quantity and quality of behavioral responses (Berrol, 1992, p. 27).

In a quantitative and qualitative pilot study of the effectiveness of dance movement therapy with older adults who have suffered traumatic brain injury or stroke, Berrol, Ooi, and Katz (1997) find support for their premise of the benefits of DMT with that population. Their premise is that older adults with neurotrauma (none with progressive dementia) will benefit from DMT in the areas of physical, psychosocial, and cognitive function. Quantitative data are collected on physical function, rhythmic discrimination and timed motor activity, cognitive performance, mood, and social interaction. Qualitative data are collected through a patient satisfaction survey and video taped sessions with a clinician's report. Their results in physical functioning show improvements of the experimental group over the control group in three dynamic balance and range of motion items; also some nonambulatory participants began to walk again during the DMT sessions. The experimental group also shows significant post-test improvement in cognitive performance with specific memory improvements notable in the qualitative analysis. Quite interesting is the result of significant gains in social interaction for the experimental group. Berrol and associates (1997) make the point that this is especially striking as all the centres involved in the research provide group oriented activities to promote social interaction (which the persons in the control group participated in).

Although cautious in their conclusions Berrol and associates say that, "...serving not only as a medium for self expression and shared communication, DMT appeared to enhance particular domains of human function associated with the quality of life" (1997, p. 152). Improvement in quality of life is noted as a potential benefit from involvement in a drama and movement therapy for patients with progressive dementia. Wilkinson, Srikumer, Shaw, and Orrell (1998) point out, in their quantitative and qualitative pilot study, that drama and movement therapy is not widely used with people with dementia. The quantitative aspect of this study measured cognitive function in general and specific to DAT, behavioral functions and Activities of Daily Living, depression, and lastly general health. Their results show no significant changes on any of these measures for either the control or experimental group. The qualitative aspect of the study demonstrates the richness of emotion (contact, laughter, and friendliness) experienced by the participants.

Wilkinson and associates (1998) and Berrol and associates (1997) report quality of life benefits. A caution in assuming experimental evidence to these effects is justified as both groups of researchers report difficulties with selecting for unbiased, randomized groups. The main difficulty in obtaining such experimental and control groups, from people with dementia, is the need for a large pool of subjects that meet age, sex, cognition and dependency requirements (Wilkinson et al., 1998). Berrol and associates (1997) recruited participants from five different geographic regions. Despite this, at all but two of the eight facilities problems arose that required the researchers to use quasi-randomized assignment.

Wilkinson and associates (1998) say that the qualitative benefits of their drama movement therapy may have been due to the group work done. However they point out that the control group also engaged in group-activity. They suggest that it is reasonable to associate the improvement in quality of life with the drama movement therapy. “Deterioration in dementia is expected but stimulating and maintaining social skills, independence, self-esteem and self-belief through drama therapy may improve quality of life" (Wilkinson et al., 1998, p. 200).

Elements of dance movement. Dance movement therapy varies broadly in implementation, but is always based in movement observation and the possibility of change.

> Dance therapy stresses changes in the learning experience. Sensory, kinaesthetic, and feeling experiences are developed through movement, instead of repetitive mechanical rote-learning. And the movement processes themselves are expressive—statements of feeling and thinking (Bartenieff & Lewis, 1997, p. 151).

Dance movement therapy often uses Labananalysis (developed by Rudolf Laban) to identify an individual's expressions and interactions; as well as for the therapist's observations of an individual outside of the therapist's interactions (Bartenieff & Lewis, 1997). Laban (as cited in Bartenieff & Lewis, 1997) describes four Effort elements of movement. Laban relates these elements (space, weight, time, and flow) to stages of the inner state of mind, which prepares a person for a movement action. Kestenburg developed a movement profiling system (the KMP) that is an elaboration of the Laban system within a developmental context (Kestenberg Amighi, Loman, Lewis, & Sossin, 1999). Either system can be used with a variety of theoretical frameworks; both are flexible within the study of nonverbal behavior (Kestenberg et al., 1999).

Bartenieff and Lewis describe the basic aspects of these Effort elements in this way: The element of space has a characteristic quality of *attention,* of orienting toward something—generally or specifically. The space Effort involves a degree of conscious awareness (unlike other Effort elements). The element of weight has a characteristic quality of *intention*, where one asserts strongly or lightly against the pull of gravity. The element of time is imminent or delayed. This does not relate to duration of time but rather to an *attitude* toward time; the quality of the message conveyed. The element of flow has a characteristic quality of *progression* that is allowed free reign or is held in control. Flow is how action is initiated and underlies all other Effort elements.

These Effort elements combine in many ways that give each person his or her characteristic, overall-, and momentary-movement styles. Effort elements each have a range that allow for the infinite variety of shading of individual styles and inner impulses to move. "...the same activity, done by two individuals, may be organized with somewhat different Effort punctuation—Effort rhythms—even though the same elements are being used. When two people do the same thing, it is not the same (Bartenieff & Lewis, 1997, p. 53).

Rhythm and phrasing. Any one action can be a sequence of movement Efforts in varying shades and combinations. Spatial paths, tensions and shapes, and an awareness of body articulations are other observational information used along with Effort elements in Labananalysis (Bartenieff & Lewis, 1997). What Labananalysis or the KMP offers the dance movement therapist is a vocabulary and analysis of the external states (movements) and the internal states associated with those movements. "The training in visual and kinaesthetic perception prepares the observer to perceive concretely the integration of physical muscular levels of activity with the feeling, thinking levels of behavior in terms of body, Effort and space" (Bartenieff & Lewis, 1997, P. 144). Bartenieff and Lewis say that the dance movement therapist is then equipped to help an individual find an acceptable identity and satisfying mode of behavior. They note that this newly acquired self must be in relation to society in general, such that a context of flow between internal and external states can be actively maintained. "An emphasis on internal awareness *divorced from spatial context* can be self-defeating and immobilizing and cut the patient off from experiencing interaction with others" (Bartenieff & Lewis, 1997, p. 144).

Rhythms are based on polarities, such as asleep/awake; work/rest; exertion/recuperation (Bartenieff & Lewis, 1997; Kestenberg et al., 1999). Movements within a simple rhythm (e.g., push/pull) are the most basic of movement phrases. Bartenieff and Lewis say that "...[when] performed in exact repetitions, these—phasic phrasings produce rather monotone rhythms that can be dulling or soothing" (1997, p. 74). Such a rhythm may serve as a type of homeostasis in times of stress because it re-establishes a rhythm underlying all neuro-muscular perceptions. Although these rhythms may be comforting and possibly the basis of future sensory-perceptual awareness, expansion into life and living involves more complex rhythms; developed through experiential interaction with others. Addressing the use of singular Efforts of rhythms Bartenieff and Lewis say:

> There is particular danger in repetition of a prescription, such as singling out one type of action with the same verbal accompaniment to serve as a module for changing a specific aspect of behavior by reproducing the sequence over and over, day after day. The action may sooner or later, become a conditioned response (as in behavioral modification), but the loss may thereby be greater than the gain. For when the response is merely a "conditioned" response, the *intent* of movement dynamics is no longer a fresh movement impulse arising from a given momentary body/mind state. Instead it becomes mechanistic and isolated from the live and constantly fluctuating process of the whole organism. It may become frozen out of the multi-level process (Bartenieff & Lewis, 1997, p. 149).

New directions for dance movement therapy. Despite the long-standing alignment of DMT with psychological theory there has been a recent shift of focus toward the health care field in general (Dosamantes Beaudry, 1997). The main support for this shift in focus by some dance movement therapists is research in the area of psychoneuroimmunology (Fairweather, 1997). DMT is being required to adapt to a medical model perspective with diagnostic criteria and brief-term treatment (Fairweather, 1997). Historically there has always been pressure to prove the effectiveness of DMT; however the new challenge will be to quantify this proof in the language of the medical professions with underlying scientific principles (Chaiklin, 1997; Fairweather, 1997). Chaiklin (1997) suggests that single-subject designs offer dance movement therapists the opportunity to meet this challenge. He says that "[w]hile part of almost any aspect of human thought and feeling can be captured in a scale this design [single-subject] squeezes the richness out of what practice [dance movement] is" (Chaiklin, 1997).

Single-System Methodology

Single case (single-subject) research methodology (Kazdin, 1982; 1998) or single-system methodology (Perrin, 1998; hereafter called SSM) is used when the researchers are looking for a clinically significant effect rather than, or in conjunction with, a statistically significant effect (Kazdin, 1982). The latter effect found in group-comparisons, where the effect is averaged across participants, may produce a distorted picture of the intervention effect on the individual (Kazdin, 1982; Perrin, 1998). A clinically significant effect refers to the impact an intervention has on the participant's functioning such that an important change occurs (Kazdin, 1999). Kazdin (1999) says that statistical significance refers to the reliability and magnitude of the group difference from the intervention effects. Further he says that a clinical change is not necessarily a change in symptoms. In situations where it is known that symptoms will continue to deteriorate (e.g., DAT) a clinical change may be achieved by helping a person cope with such symptoms or impairment, or to achieve an improved quality of life (Kazdin, 1999). Kazdin says it is a question of clinical impact—do the findings of the study "...reflect a change that does have an impact on the individual's functioning in everyday life or a change that makes a difference" (Kazdin, 1999, p. 336). He explains that to achieve this some supporting evidence must be provided to show there is an important, practical, and worthwhile change in the functioning of the participant in everyday life; and that this should be based in the idea that clinical significance is a multidimensional concept.

Direct observation of the behavior of individuals is sometimes the only way to evaluate the effects of therapeutic interventions for persons with dementia (Perrin, 1998). Despite the differences in clinical and statistical significance Kazdin says that the underlying rationale of SSM is similar to between group methodologies as both "...compare the effects of different conditions (independent variables) on performance" (Kazdin, 1998, p. 207).

An example of the value of this methodology is a study by Goldsmith, Hoeffer, and Rader (1995), which examines the problematic wandering behaviors of four elderly persons with cognitive impairment. The study includes a pre-intervention phase of four weeks, and intervention phase of four weeks and a post-intervention phase of six weeks. Observational data is collected on wandering behavior as the dependent variable. Data on performance of activities of daily living (ADLs), behavioral mapping (Snyder, 1978 as cited, use of psychotropic medications and restraints as well as selected nonverbal response by staff are collected. The report by Goldsmith and associates (1995) focuses on one male participant of the study. This man Mr. A has DAT and is of special interest to these researchers because visual inspection of the data collected on his behavior shows a pattern contrary to the behavioral patterns of the other participants. This information may have been lost in a group comparison design.

The independent variable of this study (Goldsmith et al., 1995) involves a reduction in the need of antipsychotic medication and the use of restraints, as staff knowledge of interactional and environmental strategies increase due to a training program. The researchers hypothesize that within and after this intervention period problematic wandering behaviors will decrease (Goldsmith et al., 1995). The researchers conclude that the intervention effect is inconsistent and explain fully the results based on a case study of the data collected on Mr. A. The researchers expect that staff will spend more time in meaningful activity with the participants. They state that surprisingly Mr. A spends greater amounts of time alone (nearly 80 %) after a slight reduction of time alone during the intervention period.

Visual analysis of graphic displays shows that a return to baseline ignoring / avoiding behavior by staff (verses retrieving / diverting behavior by staff) at the post-intervention phase is accompanied by an increase of problematic wandering by Mr. A. In fact the graphic displays show that ignoring / avoiding behavior by staff directly precedes Mr. A. attempts to exit without accompaniment (Goldsmith et al., 1995). From their study Goldsmith and associates make recommendations for nursing home practice including: Careful consideration of the use medication and restraint as a reduction in these is associated with the participant's increased involvement in ADLs; sufficient time for residents and staff to interact during programs which respond to the residents' needs for activity and rest; specially designed units which allow safe wandering behavior; an awareness and reeducation of the negative nonverbal cues staff respond with at times.

Since this study was done in 1995 we can see that many of these recommendations are successfully in place within special care units for people with DAT. This exemplifies Kazdin's (1999) point of clinically significant effect, and is a poignant example of the potential of SSM to show us what may be right before our eyes. The following review will cover important aspects of SSM including methods of data collection, experimental control, evaluation and data analysis, social validity, and the use of SSM in ethical TR research.

Data Collection

Data collection in SSM is by observations during the baseline and experimental periods, which allow the researcher to examine elements of the participant's performance, such as trend, level, variability and stability (Dattilo, Gast and Schleien, 1993). Performance behaviors can be measured by; overt behavior, frequency, discrete categories (e.g., duration, number of responses), and the number of clients (Kazdin, 1982). Some methods of recording behaviors include continuous recording, interval recording and time sampling (Perrin, 1998). Dattilo and associates (1993) describe SSM as a methodology in which each individual receiving the intervention serves as his or her own control. They say a baseline period is established during which the intervention is withheld. The experimental period is established during which the individual participates in the intervention. The intervention effects are measured over an extended period of repeated measurement of the individual's performance. Kazdin (1998) says the baseline phase has two functions: (1) a descriptive function such that the baseline provides information about the participant's behavior or problem, and (2) a predictive function such that the baseline provides the basis for prediction of future behavior if the intervention is not provided.

Observation of Behavior

Repeated observation of behavior is fundamental to SSM (Kazdin, 1998). These repetitions will usually occur on several occasions before the intervention (independent variable) is introduced. These preliminary observations allow the researcher to obtain enough data to determine if there is a pattern and or stability to the participant's behavior. Once the intervention has been introduced the further observational data will tell the researcher if the participants behavior changed and if this change coincided with the introduction of the intervention (Kazdin, 1998).

Perrin (1998) says that some behaviors (e.g., spitting, shouting) are performed in discrete and countable occurrences. This type of behavior is easily counted over a specific time period; therefore the name *frequency* measurement. Some behaviors cannot be counted as easily as single occurrence but can be categorized such that they have a distinct beginning and end (Kazdin, 1982). *Discrete categorization* is used when a frequency measure will not provide meaningful information, usually because there are a limited number of opportunities to perform the behaviors. For this type of measurement may types of behaviors may be categorized and then recorded as to whether or not they occurred (Kazdin, 1982). An example of this type of measurement would be a checklist of morning self-care activities. Sometimes useful information can be obtained by knowing how many people expressed a certain behavior. *Counting of individuals* may be a reasonable way of measuring the different recreational activities if participation is an important criterion for funding. Alternatively researchers may wish to know if more people will attend a program if a certain element of that program is changed (e.g., outside the building verses inside the building).

Other behaviors cannot be counted easily over time. However as they occur the *duration* of their occurrence can be measured. These include less discrete behaviors such as activity engagement, social involvement and conversation (Perrin, 1998). In addition to how long a behavior is performed Kazdin (1982) includes how long it takes a participant to begin a behavior as a possible duration measurement. When duration is measured the focus tends to be on how long the behavior occurs with a goal of extending or limiting that time period (Kazdin, 1982).

Perrin says that another way behavior is measured is according to the *quality* of that behavior. For these behaviors it is how the behavior is performed that determines the frequency that is recorded. Examples of this type of behavior are mouthfuls of food without spitting out, self-initiated decisions during an activity, and distance walking a circuit with enthusiasm. Perrin identifies another way of categorizing observational behavior that she calls *stimulus control*. Behavior in this instance is noted as occurring in the presence of some stimuli but not others. Such a stimulus control could be the presence of a particular staff member (Perrin, 1998). The observations qualified by this stimulus could be measured according to frequency or duration of occurrence. Both quality and stimulus control types of measurement categories are similar to what Kazdin (1982) calls *response-specific measures*. He uses this term when "...some feature of the response or the situation in which behavior was observed allowed an assessment format peculiar to the behavior of interest" (Kazdin, 1982, p.34).

A further category of behavioral observation used in SSM is *psycho-physiological assessment* (Kazdin, 1982). This type of measurement may involve measures of heart rate (ECG), pulse rate, skin temperature, muscle activity, and other physiological and or neurological responses. These measures are used similarly to bio-feed back where the resulting information is used to examine the activity or behavior of interest (Kazdin, 1982). Kazdin says that occasionally a participant's *self-report* of thoughts, feelings, behaviors, or perceptions may be of value in understanding a clinical problem. However he points out that self-report can be subject to many biases and inaccuracies. Further he acknowledges that there are instances such as obsessive thoughts and hallucinations where self-report may be the only possible method of assessment (Kazdin, 1982).

Recording of Behavior

Perrin (1998) identifies three basic methods of observational recording for SSM; continuous recording, interval recording, and time sampling. During *continuous recording* every instance of the behavior of interest is recorded for a specified time period. *Interval recording* breaks the specified time period into smaller intervals (e.g., 15 or 30 seconds). During each interval the behavior of interest is recorded only once, even if it occurs more often. Perrin says this type of recording is useful when multiple behaviors are of interest. When extended periods of time are required (e.g., to monitor sleeping patterns) then *time sampling*, where behavior is observed for a brief moment at the end of a specific time period, may be the most suitable method of recording (Perrin, 1998).

Experimental Control

Validity

Internal validity ensures that the conclusions drawn, regarding the observed behavior (i.e., dependent variable) which results from the experimental manipulation (i.e., independent variable), are not influenced by factors outside of the experimental control (i.e., the therapeutic intervention; Dattilo et al., 1993). External validity allows for the researcher to show a relationship between the dependent and independent variables (Kazdin, 1982). As well, external validity is a quality of the experimental method that enables the findings of the research to have application beyond the experimental situation (Dattilo et al., 1993).

Internal validity. Threats to internal validity of SSM include the following situations:

- *History and maturation*; in which other events in the participant's experience over time, or changes in the participant may account for the observed results.
- *Testing*; in which the repeated observation or testing of the participant, as an influence separate from the intervention, effects a measurable change on the dependent variable.
- *Statistical regression*; in which there are flucuations of extreme scores during assessment that can be mistaken for an intervention effect.
- *Instrumentation change*; in which some aspect of how the dependent variable is measured changes during the research.
- *Diffusion of treatment*; in which the different conditions of two or more treatments do not remain separate and distinct.

  - *Instability*; in which the intervention effect is only temporary or cannot be replicated (Dattilo et al., 1993; Kazdin, 1982).

Threats to internal validity are controlled by systematic application of the experimental design based on objective (operationally specific), repeated (scheduled assessments), and reliable (high interobserver agreement) data collection (Dattilo et al., 1993). These aspects of data collection will be discussed further on.

External validity. Threats to external validity of SSM generally involve features of the experiment that may delimit the generality of the findings. These may include the following situations:

- *Types of Generality*:
  - *Across participants*; in which the types of the participants of the experiment are too specific and different from those across which the results are to be extended.
  - *Across settings*; in which the experimental setting is too specific and different from that across which the results are to be extended.
  - *Across times*; in which the results do not extend beyond the period of the intervention into the period of the day in which the intervention is not given (also called maintenance).

  - *Across behavoir change agents*; in which the intervention requires administration by persons with special skills, training or expertise.
- *Reactive experimental arrangements*; in which the results of the intervention are affected by the participants' knowledge of the experimental or special conditions.
- *Reactive assessment*; in which which the results of the intervention are affected by the participants' knowledge that they are being assessed.
- *Pretest sensitization*; in which a pre-intervention assessment affects how the participant responds to the intervention.
- *Multiple treatment interference*; in which two or more treatment , as well as the order of those treatments are neccessary components of extending either treatment to other persons (Kazdin, 1982).

Threats to external validity are controlled by direct replication (same investigator repeats the same investigation) and by systematic replication (using the same independent variable with two or more other conditions of the original investigation altered).

Kazdin (1982) says that when any of these or other threats to external validity are found to be in effect we do not have to consider a total lack of generality; rather we can observe caution in our findings and restrict the generality to certain conditions. Kazdin comments that in this situation, it is the place of further research to determine the accuracy of these limitations. He notes also that waiting for subsequent studies is not always possible in applied settings such as schools and hospitals. Often the generality of the results are recognized only for the test condition (e.g., the clinic), but it is the carryover effect to another environment, time, etceteras that is of special interest (e.g., carryover to home).

Replication. Dattilo and associates (1993) state that it is through replication of results that the generality of those results can be assessed. Direct intersubject replication and systematic replication are methods often used to establish the generality and external validity of research results (Dattilo et al., 1993; Sidman, 1960). Direct intersubject replication involves repeating the same experiment, including the same procedures, and the same investigator, but with different participants. This type of direct replication (as opposed to direct intrasubject replication) addresses the issue that persons in a study differ, and often in SSM this type of replication is obtained by including at least three participants in the investigation (Dattilo et al., 1993).

While direct replication establishes further what has already been shown, systematic replication can provide new knowledge regarding the area of interest (Sidman, 1960). This type of replication involves changing some of the conditions of the original research. Although the investigator, participants, target behaviors and settings may be changed, the independent variable is not changed in any significant way (Dattilo et al., 1993). High external validity is obtained when most of the research conditions are different than the original investigation but the same results are obtained (Dattilo et al., 1993).

Reliability

Reliability of measurement (the consistency of measurement to yield similar results for the same individual under different conditions) depends upon different observers achieving agreement of accurate observations of actual behaviors (Dattilo et al., 1993). Kazdin (1982) says that interobserver agreement is the main method of ensuring reliability in SSM. Such reliability requires that there is consistency and accuracy of observation between observers. This limits the possibility of observer bias. Another important requirement of this type of reliability is for target behaviors to have objective, clear, and complete definitions (Kazdin, 1982).

While observer accuracy involves an established standard or criterion (reflecting the participant's actual behavior), interobserver agreement is established through a comparison of the assessments made by two or more observers of the same incident (trial, observation period, etc.). Kazdin (1982) also points out that, although related, agreement and accuracy may not occur together. He says that one observer may make very accurate assessments but have low interobserver agreement with an observer whose assessments are inaccurate. On the other hand observers who have very poor accuracy may show to have very high interobserver agreement. Neither situation is desirable.

Agreement is conducted by having more than one observer independently assess the participant's behavior. These checks of agreement are done occasionally throughout each phase of the investigation. Dattilo and associates (1993) cite Tawney and Gast (1984) recommending that agreement checks are conducted during at least 20% of the intervention periods. Kazdin does not suggest a particular amount of agreement checks, however he points out that to ensure good reliability interobserver agreement must be checked often. The complexity of the observational system and the extent of initial agreement will influence the frequency of agreement checks (Kazdin, 1982).

Methods for evaluating reliability. There are a variety of methods for evaluating interobserver agreement; including the frequency ratio, the point-by-point agreement ratio, and the Pearson Product-Moment Correlation (Kazdin, 1982). Different observational formats commonly employ one of these evaluative methods. For example when a frequency count (number of behaviors observed for a period of time) is the method of data collection a *frequency ratio* will provide a percentage of total agreement between the observers. A frequency ratio is obtained by dividing the smaller total of one observer's score by the larger total of the other observer's score; and multiplying the result by 100. The resulting percentage tells us how close to each other the observers' frequency totals are. The main problem with this method is that the percentage of total agreement gives us no information as to which particular behaviors were agreed on. Kazdin (1982) points out that it is possible for the two observers to never agree on any particular instance of behavior but obtain similar totals of frequency, and so a high interobserver agreement. Aside from use with frequency data collection, this evaluation method can be used to assess agreement on measures of duration, on measures of intervals of behaviors, and on measures of discrete categories of behavior (Kazdin, 1982).

The *point-by-point agreement ratio* evaluates agreement on individual instances of observed behavior (Kazdin, 1982). Kazdin says this method is used with 'discrete opportunity' data collection where the observers can agree on each opportunity that the behavior may have occurred. Each point of behavioral response can be recorded and agreement or disagreement of each can then be calculated. This calculation does not include instances (discrete points of possible behavior) where neither observer recorded a response by the participant. The ratio computation is done by dividing the number of agreements for the trial or interval by the number of agreements, which have been added to the number of disagreements. The percentage of interobserver agreement is obtained by multiplying the resulting number by 100. This method can be used with frequency counts of discrete trials, discrete categories of behaviors, and number of persons seen to perform a target behavior as well as for interval recording. Kazdin reports that there is some concern over the omission from the computation of nonoccurrence points by both observers. He says that this directs us to the larger issue of relative frequency or infrequency of participant behavior. This issue of frequency has an effect on evaluating agreement, such that frequent behavior will likely have a high level of interobserver agreement simply by chance. Depending on whether the participant's behavior is frequent or not the investigators may want to include agreements on occurrence or nonoccurrence in the computation (Kazdin, 1982). As well Kazdin presents situations where occurrence and nonoccurrence intervals might each receive a separate reliability measure. Even when interobserver agreement is high it is possible that observers are not agreeing on the same instances of behavior (Kazdin, 1982). Kazdin suggest that reliability checks can be plotted along with the primary observers scores to provide a visual assessment of how well the scores go together. Additionally he says that such a visual display can show whether the individual data sets lead to similar or different conclusions.

While the previous methods evaluate agreement over individual sessions the *Pearson product-moment correlation* is used to evaluate agreement over an entire study (Kazdin, 1982). This method provides a correlation coefficient that compares the observers' total scores for the sessions when reliability is being checked. The resulting coefficient (*r*) can range between -1.00 and +1.00; where the Pearson product-moment correlation equals 0.00 shows that there is no relationship between the observers' scores. Scores from 0.00 to -1.00 indicate that observers' scores relate by tending in opposite directions while scores from 0.00 to +1.00 indicate that their scores tend to go together in the same direction (Kazdin, 1982). Kazdin says that this statistic does not provide any information on observer agreement during any particular session and so it is possible that observers' scores are not especially close together but co-vary perfectly. Such a case would provide a score of a Pearson product-moment correlation equal to +1.00, although in actuality one score may be consistently and significantly higher or lower than the other. Kazdin suggests also that if frequency of behavior changes during different phases of the research design a product-moment correlation should be provided for each phase to prevent phase-related change from creating an artificially high correlation.

Another important aspect of correlation measurement of reliability is the need to take into account the probability of chance agreement among observer scores (Kazdin, 1982). When the behavior being observed occurs at a high or low frequency (base rate of behavior during an interval) there is a greater probability that some of the interobserver agreement will be due to random occurrence. Kazdin suggests different measures of chance agreement, such as one based on nonoccurrence of behavior. Similar to point-by-point agreement measures, when the frequency of behavior is high a high correlation of agreement must also exceed the agreement possible by chance. Kazdin suggests we report such chance agreements along with reliability measures, as well as information regarding how agreement on observations occurred.

Artifact and bias in reliability checks. Kazdin (1982) identifies and describes four sources of artifact and bias during reliability checks of interobserver agreements. These are:

- Reactivity of reliability assessment.
- Observer drift.
- Observer expectancies and experimenter feedback.
- Complexity of the observations.

Briefly, the first addresses the possibility that observers being aware that reliability is being checked will alter their methods of observation to better concur with the other observer. One of Kazdin's suggestions for dealing with this problem is to create a situation where observers believe they are always being monitored.

The second source of bias is observer drift, where how the observational definitions are applied change slightly over time. Kazdin points out that interobserver agreement may remain high despite observer drift. This can happen particularly with subgroups that work closely together. Even when there is only one group of observers this drift can result in the data from different phases becoming useless for comparison (Kazdin, 1982). Kazdin suggests feedback for maintaining accuracy in applying definitions, continuous training, and periodic introduction of new trained observers as way of dealing with this problem.

Observer expectancies involve the likelihood that people will 'see' what they 'expect to see'. Therefore if an observer expects to see change in the second phase it is possible he or she will see change where none occurs.

Kazdin says that in some instances it may be crucial to control feedback to the observers regarding the data obtained and the experimenter expectations.

The fourth source of artifact and bias is complexity of observations. When several behaviors are being recorded or a large number of responses are possible the accuracy and agreement of observations may be at risk (Kazdin, 1982). Kazdin says that these situations have implications for interobserver agreement such that the complexity of observations must be taken into account when training observers. Greater complexity of observation, such as simultaneous behaviors, a larger number of participants, or numerous anticipated responses demands higher levels of interobserver agreement at the training level (Kazdin, 1982).

Kazdin says that traditionally an acceptable level of interobserver point-by-point or frequency agreement has been 80 %. However care must be taken that sources of bias and artifact have not been introduced with the computation. When sources of bias and artifact have been minimized Kazdin says it possible that lower levels of agreement may be acceptable.

Kazdin identifies conditions of variability and change in observational data that may also influence a judgment of an acceptable level of agreement. He says that "...although high agreement between observers is always a goal, the level of agreement that is acceptable to detect systematic changes in the client's performance depends on the client's behavior and the effects of the intervention" (Kazdin, 1982, p. 73). Overall Kazdin suggests we consider more than one method of agreement and we specify all the conditions of interobserver agreements.

Evaluation Designs and Data Analysis

Evaluation Designs

Basic designs. The AB design is the simplest and most common design used in SSM (Perrin, 1998). The A-phase represents the period of baseline observation while the B-phase represents the period of intervention observation. The rationale behind the design is that the intervention will effect a change in behavior that will be observed to be different from the predicted level of the baseline if the intervention had not been introduced (Kazdin, 1982). There are many other designs used in SSM that are variations on this basic design (Dattilo et al., 1993; Kazdin, 1982; 1998; Perrin, 1998). Another very commonly used design is the withdrawal, reversal, or ABAB design (Dattilo et al., 1993). This type is based on an ABA design. These designs have in common a measurement of baseline phase, implementation of intervention phase, and the removal of the intervention phase. These extend the rationale of the AB design by expecting a change back to baseline level of behavior when the intervention is withdrawn (ABA) and as well a recurrence of the 'changed' type of behavior when the intervention is reintroduced (ABAB). As with the AB design, where stability of baseline behavior must be observed before the introduction of the intervention, in all single-system designs stability of observational data must occur before the next phase can be introduced (Kazdin, 1982).

Kazdin (1998) says that one problem of the basic designs is, that if after the intervention phase the participant's behavior does not revert to the baseline levels, the researcher cannot surmise a causal relationship between the intervention and the behavioral change. We cannot show then that the participant's behavior was under the control of the intervention and must then consider that some other event may have caused the change in behavior (Kazdin, 1998). On the other hand the situation of a clinically effective intervention which when withdrawn worsens the participant's condition shows an effective causal relationship but may be considered an unethical practice.

Multiple designs. There are a number of single-system designs that go beyond the basic designs. Dattilo and associates (1993) categorize these as multiple baseline designs, multiple probe designs, and multielement designs. One of the advantages of the multiple baseline design is that it is not dependent upon a withdrawal or reversal phase (Kazdin, 1998). The multiple baseline design involves introducing the intervention at staggered intervals across behaviors, phases or persons (Dattilo et al., 1993). Once baseline stability is achieved this design requires at least three separate introductions of the intervention; each new introduction of the intervention occurring after stability of the previous intervention data set is achieved (Dattilo et al., 1993). Kazdin says that "[a] causal relation between the intervention and behavior is clearly demonstrated if each response changes only when the intervention is introduced and not before" (1998, p. 217). Multiple probe design is similar to multiple baseline design but uses intermittent rather than continuous data collection (Dattilo et al., 1993). The main advantage with this design is the saving in time and personnel. Another more complex design, the changing-criterion design shows the effectiveness of an intervention by demonstrating incremental changes in set criterion of behavior (targets) relate to incremental changes in the behavior (Kazdin, 1998). Multi-element design is used to show the effectiveness of two or more interventions on one target behavior (Dattilo et al., 1993). This type of SSM design, which Kazdin (1982) calls multiple-treatment designs or ABCABC designs, can have problems related to order of treatment. However it is generally the type of scheduling of the multiple-interventions that enhances the evaluation of the effects (Kazdin, 1998). Multiple-schedule design (a stimulus-response training often used with animal subjects) involves two interventions and associated stimuli conditions implemented during the same phase and targeting the same behavior. If the different interventions are each consistently associated with specific behavior during the phase then each distinct stimuli can be shown to exert control over the participant's behavior (Kazdin, 1998). Simultaneous-treatment designs involve, for the most part, the administration of interventions across different stimulus conditions (i.e., therapists, settings, period of the day). The rationale of this design is that when the intervention is administered in a balanced manner across all stimulus conditions (e.g., with many different therapists) it is possible to examine the effects of the intervention on a single target behavior that is not confounded by the particular stimulus of concern (Kazdin, 1982). Kazdin (1982) describes many other variations on multi-element designs. Kazdin explains that most multi-element designs depend on interventions that produce rapid effects with little or no carryover effect. As well, to be suitable for this design treatments must be considered regarding treatment or intervention interference, which will limit the conclusions that can be drawn (Kazdin, 1982).

Combined designs. Dattilo and associates (1993) say that single-system designs can be combined in various ways to increase researcher confidence in the results. As well they state that single-system designs can be combined with other research methods for the same reason. The research design I am proposing is such a design. This proposed design comprises an aspect of multi-element design within a basic ABAB scheme. Unlike the multi-element design this proposed design changes intervention treatment for each phase rather than within one phase; although this is not a straight ABAB design because it comprises a no treatment baseline period and two separate and different treatment interventions with a reversal to the first treatment after the second has reached stability (ABCB). Another way this design is a combined design is that it includes a pre- and post-test of cognitive abilities for each phase of the entire design. The differences between this and the usual pre- and post test experimental research design is (1) a lack of a control group, (2) a lack of random selection, and (3) a lack of random assignment to groups; all of which are constrained by the nature of the disease the people in the participant group suffer from. Therefore this combined design based in SSM provides what I hope is the best possible and ethical method of researching the benefits of DMT with people with dementia.

Data Analysis

Perrin (1998) describes data analysis in SSM as graphic presentation and visual inspection. She says that a visual analysis is the search for patterns of change in trend, level, and variability. Dattilo and associates (1993) say that a graphic presentation is the visual display of numerical data. The use of graphic presentation demands that the intervention impact is significant for the investigator to be able to make a clear judgment of the effects (Dattilo et al., 1993; Kazdin, 1982; 1989). Therefore SSM is used generally with interventions where a large effect is expected. Perrin (1998) says that occasionally a statistical analysis is necessary to establish a clear pattern of change and a statistical analysis can also assist in the interpretation of small intervention effects. Perrin (1997; 1998) also notes that this may be necessary in research involving persons with dementia; as the individual's ability to respond may be constrained by cognitive deficit and there may be problems obtaining large treatment effects due to the variability and heterogeneity associated with dementia.

Criteria of analysis. Kazdin (1998) outlines the basic criteria for visual inspection of a graphic presentation. He notes that although this inspection is by subjective judgment the intervention effects are generally very strong and the criteria well defined. The criteria for visual inspection involve both the magnitude of the observed change in the data, as well as the rate of these changes (Kazdin, 1998). *Mean* and *level* are characteristics of change in magnitude; while *trend* and *latency of change* are characteristics of change in rate (Kazdin, 1982; 1998).

A change in the mean of the data from one phase to the next (e.g., from A-baseline to B-intervention in an ABAB design) shows a shift in the average magnitude of performance of the target behavior (Kazdin, 1982; 1998). Kazdin (1998) says that when this type of change is consistent it indicates that the data pattern meets the requirement of a single-system design. Figure 2.2 shows a hypothetical example of the graphic presentation of an ABAB design indicating a change in means. Note the solid line that is representative of the mean of the data for each phase.

The second characteristic of a change in magnitude is a change in level, which is independent of a change in mean. A change in level indicates whether the intervention produced reliable effects (Kazdin, 1982; 1998). Kazdin (1998) says this can be seen visually by noting a shift or discontinuity of performance data at the end of one phase in relation to the beginning of the next phase. This information relates directly to what occurs immediately at the beginning and end of the treatment intervention (Kazdin, 1998). Figure 2.3 shows a hypothetical example of the graphic presentation of an ABAB design indicating a change in

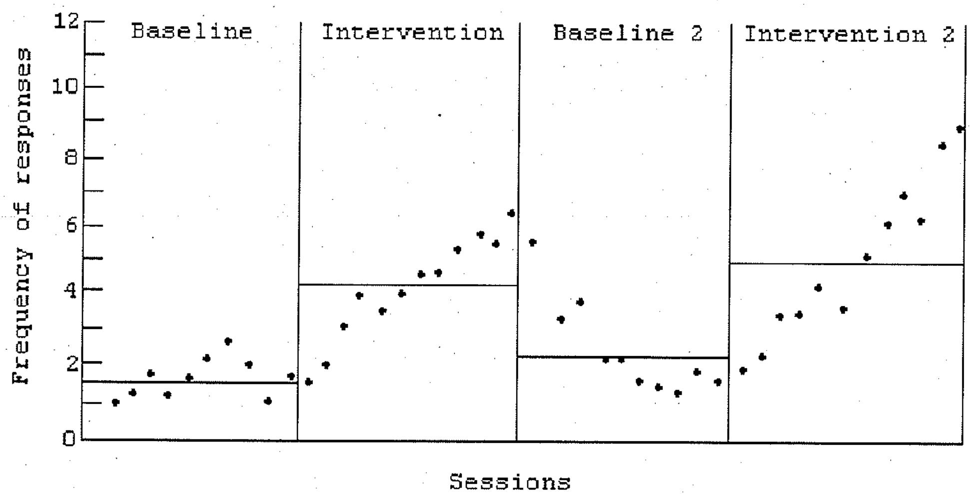


Figure 2.2. Hypothetical example of responses in an ABAB design. Solid lines represent means within each phase. (Adapted from Kazdin, 1998; 1982)

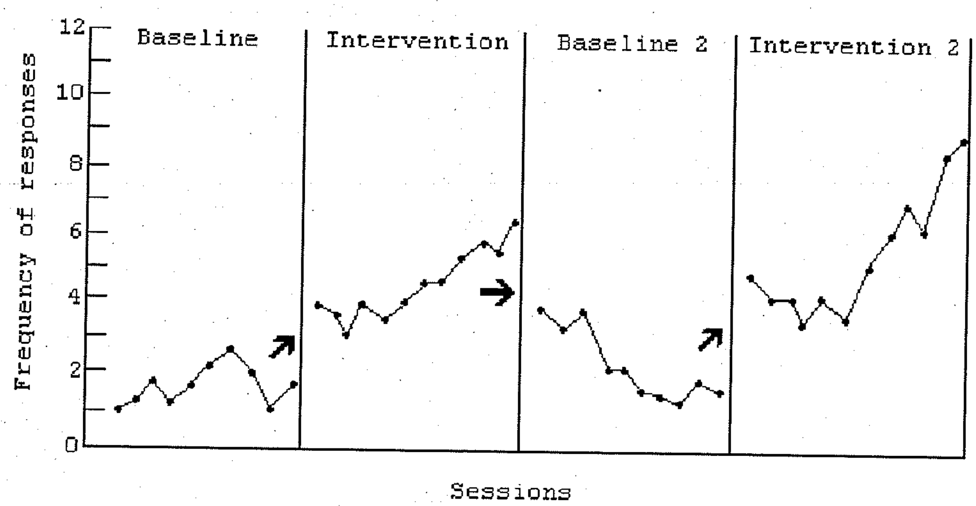


Figure 2.3. Hypothetical example of responses in an ABAB design. Arrows point to the change in level between each phase. (Adapted from Kazdin, 1998; 1982)

level by arrows pointing to the shift in direction of the magnitude of the participant's responses.

A change in rate described as trend can be seen when the slope of the graph shows a systematic increase or decrease over time (Kazdin, 1982; 1998). A change in trend over the different phases of the design shows how intervention or no intervention affects the direction of behavioral change Kazdin, 1998). If there is no trend at baseline (i.e., a flat line) a change of trend with implementation of the treatment intervention constitutes a phase change in trend (Kazdin, 1998). Figure 2.4 shows a hypothetical example of the graphic presentation of an ABAB design indicating a change in trend between each phase.

Another characteristic of change of rate in SSM is when there is no latency of change after the alteration of phases (Kazdin, 1982; 1998). Latency can occur between the end of one phase and a visual change in the rate of change in participant responses of the following phase. The closer the change in rate occurs to the change in phase the clearer the intervention effect is (Kazdin, 1998). Figure 2.5 shows a hypothetical example of a graphic presentation of an ABAB design which indicates the rate change of participant responses; however between the first two phases there is a greater latency of change than between the second two phases, which shows an immediate change of rate with second implementation of the treatment intervention.

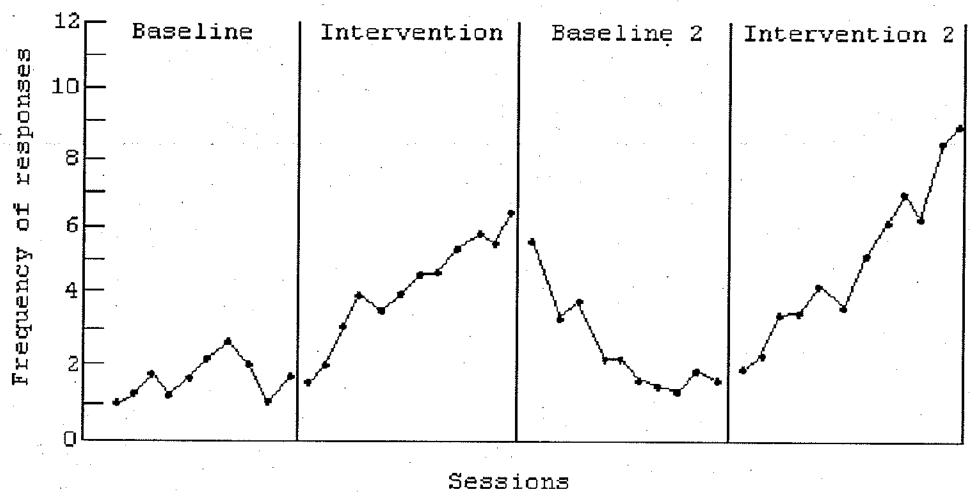


Figure 2.4. Hypothetical example of responses in an ABAB design. Changes in trend can be seen across phases. Baseline shows a moderately stable trend. With the introduction of the intervention an accelerating trend is visible. Withdrawal of the intervention (Baseline 2) shows a reversal of this accelerating trend. Reintroduction of the intervention (2) shows a return to the accelerating trend. (Adapted from Kazdin, 1998; 1982)

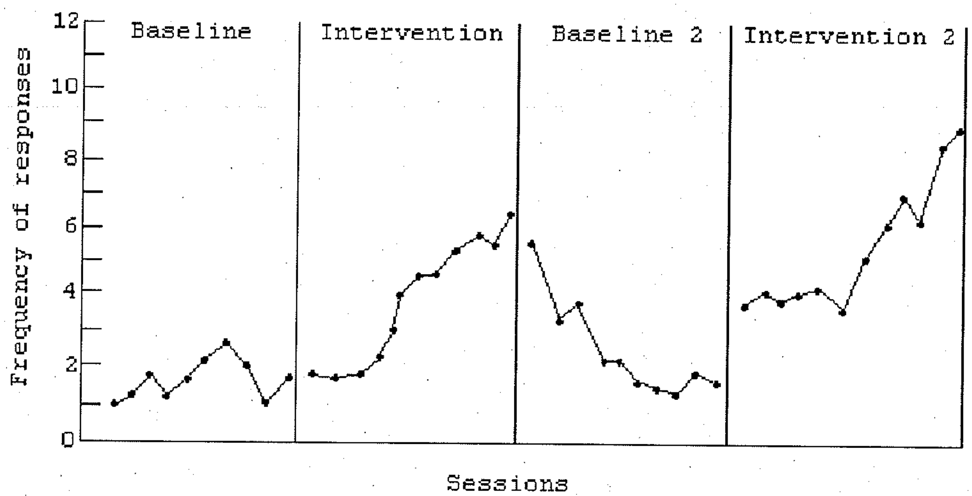


Figure 2.5. Hypothetical example of responses in an ABAB design. The first baseline and intervention panels show a latency of change after the introduction of the intervention. Baseline 2 panel show no latency of change with onset of the intervention; while Intervention 2 panel shows some initial latency of change with onset of the intervention. (Adapted from Kazdin, 1998; 1982)

The process of visual analysis. Dattilo and associates (1993) say that there are no concrete rules guiding the analysis of graphic representation. However citing Tawney and Gast (1984) they point out four important properties of visual analysis. Briefly these are:

- At least three consecutive data points within each phase; more if the data are variable.
- Change in only the independent variable from one phase or condition change to another.
- Stability of level within, and change of level between phases. With 80% of data points of each phase must fall within 20 % of the median level of that
  phase (although this may vary with expected variability).
- Stability of direction of trend within and change of direction of trend between phases.

A similar method of assessing the variability around the median can be used as is used for stability of level (Dattilo et al., 1993).

Visual analysis involves the discovery of consistent differences in stability, means, levels, and trends; as well as consideration of latency of change. This is especially easy to accomplish when there is no overlap of data across phases (i.e., when data points from one phase do not approach the data points in the next or preceding phase; Kazdin, 1998). Kazdin (1998) says that it is not enough to look at changes from one phase to another; rather it is important to look at the overall *pattern* of data for the entire design. Each of the characteristics of single-system design can occur alone or in combination, and changes across the initial phases of the design may not be repeated across subsequent phases (Kazdin, 1998). Therefore Kazdin says that "[t]he absence of a consistent pattern of data that meets the criteria limits the conclusions that can be drawn" (1998, p. 228). A drawback of this method is the rejection of intervention effects that are weak and so do not meet the requirement of the single-system design. Additionally if consistent and stable data cannot be obtained in the baseline phase interpretation of data in further phases is compromised.

Social Validity

Social validity is about the evaluation of treatment goals, procedures, and outcomes and is not necessarily the same as clinical significance; meaning that the practical and applied value of an intervention is not always equitable to the social value placed on the effects, goals or procedures of that intervention (Kazdin, 1999). Foster and Mash (1999) say that social validity explores the realm of ideas concerning viability of treatment procedures and the importance of client change, but so far only a limited discussion exists regarding how these ideas and concepts should be operationalized. Foster and Mash point out that social validity is a multidimensional construct made up of two other multidimensional constructs. These constructs are the *acceptability* of the treatment procedures and goals, and the *importance* of treatment goals and outcomes. They note that these two constructs may or may not converge. Social validation can be conducted at any time before, during or after the research depending on its purpose; that is whether to develop, improve, or appraise the intervention (Foster & Mash, 1999).

Kazdin (1982) suggests two methods for evaluating social validity. These are the social comparison method and the subjective evaluation method. Social comparison involves obtaining normative data from the 'client's' peer group. The behavior of the client, before and after the intervention, is then compared with the 'normal' peers (Kazdin, 1982). Subjective evaluation looks for distinct improvements in the client's performance that have resulted in a qualitative difference in how the client is now viewed by other people (Kazdin, 1982).

Foster and Mash (1999) say that while social (normative) comparisons evaluate generally the immediate environment of the research participant, it is important for there to be a relevant continuum from which the participant's behavior deviates. Further they say that social comparison does not address directly:

- The social acceptability of the 'behavior change' (i.e., the norm of the comparison group does not necessarily represent socially acceptable standards).
- The type of distress that may be caused by the target problem.

- Whether or not the impairment is a result of non-normative behavior.

Additional difficulties of using social comparison may be that normative data is not always available; as well, setting a distinction between normative and nonnormative behavior can be a difficult task (Foster & Mash, 1999). Foster and Mash (1999) remind us that normative behavior is not a guarantee of adaptive behavior and that nonnormative behavior is not always maladaptive. Kazdin (1982) makes the point that normative data is not always meaningful to participant groups for whom rehabilitation is unlikely (e.g., people with DAT). Since DAT is a progressive and degenerative disease the expected normative levels of behavior may be continually changing. Even if a normative group concurs on an accepted range of behavior, the expressed behaviors and experiences of the persons with DAT may in practice be so heterogeneous that standards become meaningless.

When using subjective evaluation to evaluate the social validity of the treatment goals, procedures, and or outcomes of an intervention Foster and Mash (1999) say it is important to identify the consumer group making the assessment and why this group is relevant to the issue. This information should include how the group is a representative sample as well as a description of the group characteristics. The instrument used for measurement should have content validity, reliability, and other validity if possible (Foster & Mash, 1999). Kazdin (1982) says the greatest problem with subjective evaluation is that we are relying on opinions to judge the global importance of treatment effects. Since these judgments are necessarily subjective they are subject to bias and may note change where an analysis of overt behavior does not assess change (Kazdin, 1982). Further to this Kazdin says that although a global change may reflect a clinically important change a global change does not necessarily mean that the participant's functioning has improved.

These two methods of approaching social validity may be combined; as they are different but complementary (Kazdin, 1982). Kazdin suggests that we remain aware of the difference between experimental criterion and therapeutic criterion.

> The *experimental criterion* refers to judgments about whether behavior change has occurred and whether the change can be attributed to the intervention. The *therapeutic criterion* refers to whether the effects of the intervention are important or of clinical or applied significance" (Kazdin, 1982, pp. 259-260).

Foster and Mash (1999) say that the importance of goals and outcomes, and the acceptability of goals and procedures are not static concepts but should be differentiated in evaluation. They provide a few general recommendations for evaluating social validity. These are briefly:

- The importance of ultimate (client driven) goals rather than instrumental (theory driven) goals should be justified.

Elaine A. Pelletier–Dance movement therapy for persons with dementia.

- The clinical significance of the treatment outcomes should be explicitly addressed.
- The area of treatment feasibility should be included.
- Content validity of the questionnaire is important to consider.
- For subjective evaluation we should specify who the judges were, how they were selected, which communities they represent, and the bases for selecting them.

Ethical Research of Therapeutic Recreation with Persons with Dementia

Dattilo and associates (1993) note that TR is focused on improved functioning, and independence for persons with illness or disability. Improved functioning and independence are then the ultimate goals of TR practice, which is founded upon five principles:

- A person experiences a continuum of growth and change in his or her lifetime.
- Each person has the capacity to develop and express his or her own abilities.
- All people desire to progress toward autonomy, self-responsibility, and interdependence.
- A continuum of growth for the individual means that the individual increasingly assumes more and more responsibility for his or her leisure experience.

- This continuum of growth is toward true inclusion in the person's natural community or environment (All points from Bullock & Mahon, 1997).

Although the reduction or elimination of disabling conditions is of interest to practitioners of TR, traditionally the TR focus has been primarily "...a process which guides individuals with unique needs to acquire, maintain, restore, and/or improve the attitudes, skills, knowledge, and behaviors necessary for optimal leisure functioning" (Manitoba Therapeutic Recreation Association, 2000). As a result of this strong emphasis on the individual, Dattilo and associates (1993) suggest that SSM is an appropriate and ethical research methodology for TR practitioners. With single-system methodology it is not necessary to withhold or withdraw an intervention (e.g., a control group) from people whose quality of life may be dependent on that intervention (Dattilo, et al., 1993). Single-System methodology provides clinical practitioners the opportunity to increase accountability and discover methods of more effective treatment while continuing to provide necessary services (Dattilo et al., 1993).

Method

Research Personnel

Resident Participants

Four participants with dementia of the Alzheimer type (DAT) took part in the dance movement therapy (DMT) sessions two to four times per week (depending on participant availability). All participants were residents of a special care unit (SCU) for persons with dementia at Riverview Health Centre. The patient care manager (PCM) and Occupational Therapist of the SCU ensured that all persons chosen for this group would have a Mini Mental Status Evaluation (MMSE; Folstein, Folstein & McHugh, 1975) for cognitive assessment of 15 or less out of 30. This would qualify each participant as having a cognitive assessment for late-stage DAT.

The judgment of this cognitive level for late-stage DAT was qualified by the clinical practice of the Occupational Therapist; as well as by literature reporting that severe dementia correlated with a MMSE score below 15 points (Bakchine et al., 1989), and literature reporting the communicative behaviors of persons with late-stage dementia (Kuhn, Ortigara, & Farran, 1997). These targeted, communicative behaviors were determined to be present in each participant by the senior Occupational Therapist. Saxton and Swihart (1989), and Schmitt and associates (1997) prefer the use of the Severe Impairment Battery (SIB; Saxton & Swihart, 1989) when measuring the cognitive impairment of persons with MMSE scores of below 10 points. However in the current study the MMSE may have been done many months before (at time of admitting) and a MMSE cut off score of 10 points could limit unnecessarily the potential participants.

The target participants for this research project were persons especially vulnerable due to the limiting effects of the cognitive decline that occurs with dementia of the Alzheimer type. These persons required assistance with most self-care; required a secure environment for personal safety; had some mobility restrictions; as well as other physical limitations (e.g., motor planning deficit, breathing impairment). None of the participants had speech or hearing impairments. All participants were able to stand with no support for short periods of time. One participant required time to sit after short periods of standing. All participants had some motor planning deficits in functional movement, although their abilities varied. Generally all persons with DAT have some motor planning difficulties in conjunction with conceptual memory loss and resulting cognitive difficulties. The significant nature of these combined vulnerabilities requires that caregivers have great sensitivity to these persons' needs, are alert and careful with safety requirements, and compassionate to their confusions.

The PCM and the Occupational Therapist determined that each selected participant had the physical capabilities to participate safely in the DMT program. All participants were considered by the Occupational Therapist as suitable candidates by virtue of: (1) not having aggressive behavior and, (2) possibly being interested in the dance movement activity. These participants had not taken part in any dance movement therapy for at least six months before the beginning of the study. Each participant was given a pseudonym for the purposes of data collection, analysis, and reporting. The four pseudonyms were Bev, Cassie, Rhonda, and Patrick.

Ethical considerations. The study, including consent forms, received approval (dated March 20, 2001) by the Education/Nursing Research Ethics Board (ENREB) of the University of Manitoba: Protocol #E2001:017 "Dance Movement Therapy for Persons with Dementia of the Alzheimer Type: A Dynamical Systems Perspective of Personhood". Ethical approval for the research project was received before any research-related contact with the residents of the SCU or their guardians. Consent forms were pre-tested with adults 60 to 80 years of age. No problems were found with language or complexity of the form. Some slight re-wording was done in response to suggestions.

The primary researcher (dance movement therapist) provided an information session regarding the nature of DMT and the planned research project to the family members and guardians of the SCU residents. Two days after this information session the same primary researcher provided a similar information session to the staff of the SCU. As potential participants were identified by the Occupational Therapist and PCM, each person's legal guardian was approached to request the participation of the person with DAT in the research study. These guardians were approached by the PCM with information about the research, including description of activities, explanation of risks, benefits, and voluntary participation. Some guardians requesting the inclusion of their family member approached the PCM with that request. All interaction with guardians was conducted by the PCM at her request.

The consent form (see Appendix A) suggested that all guardians consult with a third party and allow a short period of reflection (one week) before deciding on consent for the person in their legal care. Once consent was given the primary researcher approached the resident. The preferable course of consent included the presence of the guardian; however this proved to be too difficult to arrange in all but one instance. Therefore the primary researcher asked each selected resident if he or she would assent to participating in the research. Every effort was made to simplify all information. Verbal assent was received by all but one participant, whose guardian was present.

This single participant (without verbal assent) took part in the videotaping session, was unavailable for the first Daily Activity session, and subsequently proved to be an unsuitable candidate for the research project. This was due mainly to her need for constant attention for her own personal safety in the group situation. Additionally she found the group situation (during Daily Activity sessions) frustrating, attempting to bite the primary researcher. The situation was explained to the PMC who agreed to remove the resident from the project. The primary researcher was asked to telephone the resident's guardian and explain the decision. The guardian was told that on occasion other opportunities of DMT would be provided for the family member; which was conducted on at least four occasions when the dance movement therapist was on the SCU.

The PMC chose then another participant from the SCU. Written consent was obtained from the resident's guardian and verbal assent was subsequently obtained from the resident. Therefore all consent was in written form, signed by the guardian of each resident; as well as verbal assent from all resident participants. The consent form met approval of the health center.

There was no deliberate deception regarding all participants, legal guardians, friends and family members of participants, persons answering questionnaires, or healthcare center staff. Any confusions or inadvertent deception brought to our attention was immediately rectified. For instance when a participant was agitated with the observation process the primary researcher explained the process to the participant as many times as the agitation occurred. During these instances the agitation subsided with explanation, however did reoccur with forgetting. All effort was employed to provide clear, precise information. Protocol was changed (schedule adjustments, individual sessions, shorter phases, etc.) when these changes were determined to be in the best interests of the participants or other residents of the SCU.

There were no risks to the participants beyond those experienced in the course of their everyday lives. No participant was identified on any data sheet, logbook, questionnaire, written correspondence (excepting consent forms), or thesis material. There were also no direct risks to third parties as all information was kept confidential, and not identifiable to them. Risk to the environment of the special care unit from research observation disruption (unknown people; changed routines, etc.) did occur, however great efforts were made to re-schedule for SCU convenience and participant comfort. Benefits to the participants beyond those being explored in the study, included the potential enrichment of the SCU environment resulting from the presence of additional persons with compassion.

When the final analysis of the project was completed a concise and readable written report of the research findings was provided to all legal guardians. All participants were invited to engage in a conversation regarding the project and results. They were informed of their participation and thanked for their involvement in an important study. The health care center received a complete report of the findings. The health care centre will be named in any future publication, and thanked for their support.

Cognitive tests. Each participant was given a (pre-) test for cognitive function. (Lack of validity of the post-tests is explained below in *Research Design*.) Two of these participants (Bev and Patrick) were tested with the SIB (Saxton & Swihart, 1989), while the remaining two (Cassie and Rhonda) were tested with the Neurobehavioral Cognitive Status Examination (COGNISTAT, Northern California Neurobehavioral Group, 1988). Bev's SIB score was 14 of a possible 100, with the following subscores for the subscales:

- Social Interaction 2/6
- Memory 1/14
- Orientation 0/6
- Language 6/46
- Attention 0/6
- Praxis 3/8
- Visuospatial 0/8
- Construction 0/4
- Orientation to name 2/2

Patrick's SIB score was 76 of a possible 100, with the following subscores for the subscales:

- Social Interaction 3/6
- Memory 8/14
- Orientation 2/6
- Language 39/46
- Attention 5/6
- Praxis 7/8
- Visuospatial 7/8
- Construction 4/4
- Orientation to name 1/2

Cassie's cognitive status profile on the COGNISTAT showed that she screened average for three of the eight subscales, as well as in two sub-components of one subscale and in one sub-component of another subscale. Cassie tested in the severe range for Orientation. For the subscales Memory, Construction, the Comprehension sub-component of Language, and the Similarities sub-component of Reasoning she scored in the moderate range. Cassie's COGNISTAT scores were:

- Level of Conscious alert
- Orientation 1/12
- Attention 6/8
- Constructions 2/6
- Memory 6/12
- Calculations 3/4
- Reasoning
    - Similarities 3/8
    - Judgment 5/6
- Language
    - Comprehension 3/6
    - Repetition 12/12
    - Naming Screen

Rhonda's cognitive status profile on the COGNISTAT showed that she screened average for six of the eight subscales. Rhonda tested in the moderate range for Memory and in the mild range for Orientation. Rhonda's COGNISTAT scores were:

- Level of Conscious alert
- Orientation 8/12
- Attention 8/8
- Constructions 4/6
- Memory 6/12
- Calculations 4/4
- Reasoning
  - Similarities 8/8
  - Judgment 5/6
- Language
  - Comprehension 6/6
  - Repetition 12/12
  - Naming 8/8

Concerned Persons

Persons considered to be involved in the residents' lives (e.g., health care aides, therapist, family members, friends, etc.) were the target group of the concerned persons social validity questionnaire (see Appendix B). This questionnaire was made available to persons at the SCU and included a separate consent form (see Appendix C). Respondents were not at any personal or professional risk. All information gathered was and is kept confidential. Respondents were not identified in any of the data collected. This information (including respondent identifiable consent forms) has been and is kept in a secure location and will be destroyed after any publication and verification of the data is complete.

There was no plan for compensation in this research project. However if participants, staff members or guardians expressed a need for this, the primary researcher therapist would consider negotiating a period of DMT for participants or other persons on the SCU after the project was complete. This could include a one-time workshop on the principles of dance movement therapy or the program developed for persons with late-stage dementia.

Therapists and Researchers

The dance movement therapist (primary researcher) provided the intervention sessions. The Occupational Therapist conducted the cognitive assessments using two measurement tools, the Severe Impairment Battery and the Neurobehavioral Cognitive Status Examination. One research assistant conducted behavioral assessments with a variation of the Positive Response Schedule (PRS; Perrin, 1997; see Appendix D for original PRS) while a second research assistant provided interobserver reliability, as well as treatment integrity for the DMT sessions (see Appendix E). For one occasion (June

5,2001) a substitute treatment integrity recorder was needed. The dance movement therapist (primary researcher) conducted the treatment integrity for the daily activity sessions (see Appendix F). An important advantage of this study is that it took place in a special care unit staffed with trained professional familiar with the residents.

Research assistants were informed that the safety of the residents was of greater importance than the data collection. They were instructed to respond to any agitation or aggression by participants, or other residents with that comment in mind. All research assistants were instructed on anonymity and confidentiality. Research assistants were aware of participants' first names and addressed them with these names. However during discussion of interobserver agreements every effort was made not to use the participants' names. The research assistants were instructed as to the confidentiality of all experiences and observations of other persons in the SCU; including respect for their home, and for staff occupation and positions. All data collected has been and is kept in a secure location, and will be destroyed after any publication and verification of the data is completed.

Positive Response Schedule training. On April 11, 2001 videotape of a mock Daily Activity session and a DMT session was made with the original four participants. These sessions were offered as a group protocol. The co-primary researcher coordinated the Daily Activity session (approximately 12 minutes long) and provided the DMT session (approximately 12 minutes long). One of the research assistants operated the videotape camera. The videotape focused on each participant for three minutes in each session. These sessions were run consecutively.

Training for use of the PRS, and for a satisfactory level of interobserver agreement occurred on four separate dates between April 18, 2001 and May 3, 2001. Training was done with videotape screening and the PRS procedures (as described below). There were slight changes to the PRS procedures. These changes involved the observation of only one block of baseline or intervention time, as well as the consecutive observation of baseline and intervention conditions. Interobserver agreements were determined between both research assistants and between each research assistant and the primary researcher. Training continued until these agreements were all above 80% (as calculated by the method described below).

The videotape was stored and used with concern for the confidentiality of the participants. Every effort was made to avoid the videotaping of persons not involved in the project. Despite this there was a brief view of an uninvolved resident of the SCU. This was mentioned to the PCM of the SCU. The videotape continues to be stored in a secure place. Upon completion of the thesis the videotape images will be destroyed.

Setting

The dance movement therapy sessions took place within the special care unit (SCU) of the health center where the residents lived. The locations of the

Daily Activity sessions depended upon where each participant was at the time observations took place. Observations were not done in the participants' private rooms or washrooms. Location of the DMT sessions was for most sessions the TV sitting room of the SCU. Occasionally the adjacent hall or dining room was used for DMT sessions. The TV sitting room was a comfortably decorated, carpeted room with a love seat and a few wingback chairs. These large pieces of furniture were moved for the DMT sessions to allow space for free movement. A cabinet containing a television remained in the room. The TV was turned off during the session. There were two windows, covered with draperies, which were opened or closed depending on the participant's preference. Both these window looked out onto a secure walking garden used by the residents and staff of the SCU. One end of the room had a half-wall that allowed the research assistants to observe the session without being directly in the room. Occasionally it was necessary for the assistants to observe from within the room. Within the DMT area chairs were arranged for the dance movement therapist and the participant such that the assistants could easily view the participant. During the DMT sessions a CD player was used play the music necessary for the sessions.

Research Design

Within a single-system research methodology this research used an ABAB reversal design. The A-phase (baseline activity) consisted of the participants' usual activities on the SCU. The B-phase (experimental activity) consisted of the dance movement therapy program. The design included originally pre- and post-tests of the cognitive abilities of the participants. These tests were to be conducted using the Severe Impairment Battery (SIB, Saxton & Swihart, 1989). However the co-researcher (O.T.) determined that two of the participants would score near or above the ceiling on the SIB. Those two participants were then tested using the Neurobehavioral Cognitive Status Examination (COGNISTAT, Northern California Neurobehavioral Group, 1988) for both pre- and post-tests. Due to constraints the participant post-tests were not completed until six weeks after the last phase B2 DMT session. This long period of time left the validity of those test-results open to threats of the 'history and maturation' type. Therefore the pre-test results were alone used for description of participants.

The final research design was then a simple ABAB reversal; with initial phases, A (baseline) of Daily Activity and B (intervention) of DMT followed by reintroduction of the baseline (phase A2) of Daily Activity and subsequent reintroduction of the intervention (phase B2) of DMT. Phase A was comprised of seven sessions for each participant. Phases B and A2 included four sessions for each participant. The numbers of sessions in phase B2 were limited by accessibility and time. Therefore three of the participants had four sessions each while the fourth participant had only three sessions in that phase. These 18 to 19 sessions were completed within two and one-half months.

Baseline Condition

The Daily Activity sessions, which constituted the baseline condition, were conducted as individual sessions for each participant. Following the *PRS procedures* (see below) the research assistants observed each participant during whatever daily activity he or she was involved in for the timed periods. No observations were made in participants' bedrooms or bathrooms. When participants removed themselves or were removed from observation by staff those timed intervals were scored as nonoccurrence of target behaviors.

Independent Variable

The independent variable for this research design was the dance movement therapy program. The format of this dance movement therapy intervention was developed over a two-year period by the primary researcher therapist with the active participation of many persons with DAT who were part of a group residing at a health care centre. Originally the program was designed as a group intervention. Due to personality conflicts among the research participants the DMT program was changed to individual sessions. Therefore the one-hour group session became a 20-minute individual session that covered basically the same program. Changes to the program were mainly in the areas of passing and group movement. The original session plan is available in Appendix G. The revised format of a DMT session consisted of:

1. *Introductions and Greetings*
2. *Opening: Focus on Repetition* (Breathing; Seated Warm-up—head to foot)

3. *Theme Exploration: Focus on Rhythm* (Standing Whole Body Movement—swinging, twisting, reaching; Partnered Dance Steps—side to side, cross step, turning)
4. *Theme Exploration: Focus on Awareness* (Free Flowing Movement; Creative Movement Expression)
5. *Closing: Focus on Interdependence* (Responsive-Interactional Movement—seated or standing, common movement quality)
6. *Discussion and Farewells*

See Appendix H for details of this revised DMT session plan.

The music for each DMT session was a collection of pieces that were likely unfamiliar to all the participants. The music changed to mark the different parts of the session. Sessions lasted approximately 20 minutes (depending upon participant involvement).

Dependent Variables

The Positive Response Schedule. Each participant's score from the Positive Response Schedule (PRS; Perrin, 1997) was the main dependent variable. The PRS is designed to assess behavioral responses of persons with severe dementia to short, individualized interventions. The PRS uses a partial interval recording method. With this method the first occurrence of a behavior is recorded per interval. Each successive occurrence of this same behavior in that interval is ignored. A bleeping device can be used to signal time intervals. The intervals for the PRS are each 20 seconds. This allows for two observation intervals per minute with 10 seconds of recording time between 20-second observations. Theoretically it is possible to score a maximum of 20 responses in a one-minute period. Perrin (1997) points out that it would be rare to record the three emotional components in any one 20-second time frame. There are ten categories of response monitored with the PRS: Deliberate body movement, Deliberate head movement, Vocalization, Looks at environment, Looks at carer, Engagement, Initiates interaction, Happy, Sad, and Fear.

This research study used an adapted version of the Positive Response Schedule within an ABAB reversal design as opposed to the ABA reversal design suggested by Perrin (1997). The method that was used in the study was similar to Perrin's design such that we used the PRS to record observations of individual participants during activity or intervention.

PRS validity. Perrin says that the PRS has clear face validity as the measure is closely linked to the behavior being observed. Measurement of the wellbeing of persons with dementia is a fairly new area of research and there are no existing psychological indices against which to compare and contrast the PRS for criterion validity (Perrin, 1997). Thus the PRS is conceived to have construct validity within the context of engagement theory and the theory surrounding the non-verbal expression of emotion (Perrin, 1997).

Internal validity was shown by improvement on the measurement scale during the B-phase with return to near baseline (A-phase) levels during phase A2. The return to improvement during the phase B2 strengthened the internal validity of the design. This stronger argument for the valid effects of the intervention is a result of continuous assessment that shows there are marked changes with the introduction and withdrawal of the intervention (Kazdin, 1982). Threats to internal validity were controlled by the systematic application of the experimental design that included operationally specific, repeated, and scheduled data collection.

External validity was shown by replication of the effects the dance movement therapy intervention across the four resident participants in the study. This intersystem direct replication is accomplished by repeating the same experiment, including the same procedures, and the same investigator, but with different participants; in this case four participants. The generality of this study must be considered to be limited to persons with late-stage DAT residing in a SCU. Reactivity of experimental arrangements and assessments, as well as pre-test sensitivity was controlled through intersystem replication. Although time of day (i.e., amount of daytime napping) has been shown to have an effect on persons' with DAT (Kovach & Henschel, 1996) the specifics of time of day were not specifically addressed in this study. However varying the time of day of intervention during an intersystem systematic replication study could control for this; where only the time of day and possibly the participants are varied from the original study.

Systematic replication across studies although not included in the proposed design could be addressed by future studies. This could address in particular the possibility that the therapist possessed special interpersonal skills that would enhance the activity sessions beyond that which would have been provided by another therapist implementing the same program.

PRS interobserver reliability. Perrin (1997) finds the Positive Response Schedule to have a consistent average interobserver reliability of 80%. She cautions that in any specific intervention there will be circumstances related to the idiosyncrasies of individuals that threaten the reliability of certain categories. For example the category ‘initiates interaction’ had more disagreements than other categories. Perrin says that this is “due to a difficulty in differentiating clear initiatives in communication on the part of the subject, from the general ebb and flow of interaction” (Perrin, 1997, p. 189). Despite such inevitable difficulties she says that these have not undermined the general reliability of the instrument as a whole. Hadley, Brown, & Smith (1999) used the PRS to assess the impact of short, individualized intervention on well being in a pilot study with two persons with severe dementia. They report an inter-rater reliability of at least 99% for the three observations periods of each of the two participants receiving the interventions (object manipulation and hand massage; Hadley et al., 1999).

For this study of DMT and persons with DAT, the research assistants used an adapted version of the PRS (see Appendix I) to measure each individual’s behavioral responses for a total of 10 minutes during each session (Daily Activity and DMT) of each phase. Interobserver agreement between the two research assistants of the adapted version of the PRS was achieved through a training period and maintained throughout the study. There were either 18 or 19 individual observation sessions for each participant across all the phases of the study. All of these sessions involved assessments with the PRS. All Daily Activity sessions during phases A and A2 were evaluated for reliability through interobserver agreements. There were 11 of these sessions for each participant. DMT sessions during phases B and B2 were also evaluated for reliability using interobserver agreement. However it was not possible to evaluate all the DMT sessions. Therefore three of the four sessions in phases B and B2 were evaluated for each participant. Exceptions to this were in phase B2 where each of Rhonda's three sessions was evaluated, and two of Bev's three sessions were evaluated.

Perrin (1997) suggests interobserver agreement for the PRS be calculated by dividing the number of intervals agreed upon by the agreements plus disagreements multiplied by 100. This is then reported as a percentage. Blank intervals are not included in this calculation. Such point-by-point agreement is considered acceptable at 80% (Kazdin, 1982). Kazdin also suggests using Cohen's kappa (*k*; Cohen, 1965, as cited in Kazdin, 1982) as an estimate of agreement, which is corrected for chance.

Kazdin provides the following formula: $k = \frac{P_o - P_c}{1 - P_c}$

"...where P*o* = the proportion of agreements between observers on occurrences and nonoccurrences (or agreements on occurrences and nonoccurrences divided by the total number of agreements and disagreements)

[and]

P*c* = the proportion of expected agreements on the basis of chance" (Kazdin, 1982, p. 66). Kazdin says that P*c* is calculated by multiplying the number of occurrences for both observers and adding the result to the product of the number of nonoccurrence of both observers, then taking this sum and dividing it by the total number of intervals squared.

This formula is then:

$$Pc = \frac{(O1 \times O2) + (NO1 \times NO2)}{I^2}$$

Where O1 and O2 are the two observers number of occurrences; NO1 and NO2 are the two observers numbers of nonoccurrence; and I is the total number of intervals. This method of determining interobserver reliability (Cohen's kappa) was used for all interobserver agreement in this research project.

PRS procedures. To ensure that research assistants were observing the same behaviors of the same participant during the same 20-second interval a timing tape was made which provided continual instructions to the assistants. Each assistant had a single earphone connected to the tape player. Therefore each assistant received the same instructions at the same moment. The tape instructed the assistants that a new person was to be observed. This was followed by a 20-second silence of observation time and a tone for the following 10-second recording time. The silence and tone format were repeated five more times for a total of six sets of 20-second observation and 10-second recording intervals. Following this, the tape instructed the assistants to begin with a new person. During Daily Activity sessions this was the point where the assistants turned the tape off and moved on to find the next participant for observation. During DMT sessions the assistants ignored the move instruction and prepared to begin the next set of intervals with the same participant. This was continued until all five sets of three-minute observations were complete.

The PRS was adapted by placing three-minutes of the timed intervals for each participant consecutively on the recording sheet. This allowed the research assistants to observe each of the four participants for five three-minute periods over the two to four hours of Daily Activity research time without switching sheets when they changed to the next participant.

The Severe Impairment Battery. Pre- and post-test scores on the Severe Impairment Battery (SIB, Saxton & Swihart, 1989) were planned as a second dependent variable. Lack of validity in the method of application of the post-tests resulted in this dependent variable being eliminated from the study (as described above).

The SIB is an instrument for measuring cognitive ability in persons with moderate to severe dementia. This instrument measures direct performance of the person allowing for partial and nonverbal responses. Compared to other instruments not designed for people with late-stage dementia it can allow a more careful assessment of the cognitive changes in the person over time. As well the person's response to therapeutic intervention can be assessed with the SIB (Schmitt et al, 1997).

The SIB validity. Schmitt and associates (1997) find that the SIB to have respectable concurrent (construct) validity by correlation comparisons with the Clinical Dementia Rating Scale (r = -0.65, p < 0.01; and CDR sum of boxes, r = -0.75, p < 0.01), the Global Deterioration Scale (r = -0.68, p < 0.01), the Functional Assessment Staging scale (r = -0.59, p < 0.01), and the MMSE scale (r = 0.83, p < 0.01). They conducted additional correlation assessments to show that the SIB score is, at the time of assessment, not related to the age of the participant with dementia (r = 0.06, NS), or the years of the participant's education (r = 0.01, NS). They also show that the duration of the dementia disorder does have a significant association with the SIB (r = -0.26, p < 0.01; Schmitt et al., 1997). In a study of dementia in persons with Downs's syndrome, Witts and Elders (1998) found a significant correlation between the Vineland Adaptive Scales and the SIB (Spearman's rho = .68, p < .001). They also find no correlation between age and the SIB score (Spearman's rho = .26, p = .15), and report that there is no relationship between gender and the participant's performance on the SIB (Witts & Elders, 1998).

The SIB reliability. Schmitt et al. (1997) report test-retest reliability correlation of Severe Impairment Battery scores for baselines and one month retest ($r = 0.90$, $p < 0.001$) and for baselines and two month retest ($r = 0.87$, $p < 0.001$). When the test-retest correlation for the baseline to one month was stratified according to MMSE groups only three of the four were significant (MMSE score 16-20, $r = 0.16$, NS; MMSE score 10-15, $r = 0.91$; MMSE score 5-9, $r = 0.80$; MMSE score 0-4, $r = 0.91$). The same stratification for the baseline to two month retest show all ranges as significant (from $r = 0.42$, $p < 0.05$ for MMSE scores 16-20 to $r = 0.72$, $p < 0.001$ for MMSE scores 0-4 of those with the most severe dementia (Schmitt et al., 1997). Schmitt and associates (1997) say that the SIB can be used to provide an objective performance-based evaluation of the cognitive functions of persons with dementia, and in particular those who have a MMSE score below ten.

The SIB procedures. The Severe Impairment Battery is applied as an interactive interview. The test is designed to avoid novel environments that are difficult for a person with DAT to adapt to (Saxton & Swihart, 1989). Questions are presented as simple one-step requests that can include verbal or gestured cues. There are 40 requests requiring up to 51 responses from the person with DAT. Some props are used with these requests. The props include a cup, plate, spoon, various colored plastic shapes, and photographs or cards of a cup, plate, spoon and shapes. The tester uses a scoring sheet to record responses. Partial responses are accepted in this test, which makes it useful especially with persons with the speech impairments that are common in people with DAT. The test lasts approximately thirty minutes.

All but two responses can be scored from zero to two points. Two points are recorded for a complete and spontaneous answer. When the person with DAT requires a cue or gives only a partial or nonverbal response a score of one is recorded. A wrong answer or no response is scored as zero. The exceptions to this scoring are two questions scored form zero to one. The total score for the test is 100 points. There are nine subscales with individual subscores as follows: Attention (six points), Orientation (six points), Language (46 points), Memory (14 points), Visuospatial ability (8 points), Orienting to name (two points), Praxis (eight points), Social interaction (six points), and Construction (four points). Saxton and associates (1990) say that a SIB score of 63 corresponds approximately to an MMSE (Folstein, Folstein, & McHugh, 1975) score of less than four. The subscales of the SIB are considered valuable for identifying cognitive and communicative strengths that remain in the person with DAT (Saxton et al., 1990).

All SIB assessments were done by the occupational therapist (co-researcher). The suppliers of the SIB require that those using the SIB for assessment and evaluation be qualified and registered for its use. This co-researcher was both registered and qualified. She followed the above protocol and procedures when administering the SIB.

Treatment Integrity

There were two different treatment integrity checklists; the first for phase A and A2 checked the integrity of the Daily Activity Observation; the second checked the integrity of phase B and B2 of the Dance Movement Therapy Program. During the DMT sessions when interobserver agreement was not being evaluated the second research assistant evaluated treatment integrity with a checklist (seven pages with a total score of 34; see Appendix E). The DMT checklist allowed the evaluator to follow along with the session and simply check in the indicated areas if a sequence was correct or repeated.

During the Daily Activity sessions the primary researcher evaluated treatment integrity using another checklist (seven pages with a possible score of 15 in each category; see Appendix F). The Daily Activity checklist was designed to allow the evaluator to note (by 1, 2, and/or 3) the one-minute period in which any of the behaviours on the checklist were observed. Thus there could be many categories within the first one-minute period. Categories such as sitting and walking were not necessarily mutually exclusive, as they could each occur in the one-minute period. Only the first occurrence of each behavior was scored for each one-minute period.

Treatment integrity was checked for 81% of sessions through all phases of the design (100% of phases A and A2 for all participants; 25% of phase B for all participants; 25% of phase B2 for two of the participants; 16% of phases B2 for the other two participants). Treatment integrity was evaluated by the following formula: The (score of what was done divided by the score of what was suppose to be done) x 100 to give a percentage. A treatment reliability of 80% is considered to be acceptable although a higher percentage of treatment integrity is desirable.

Social Validity

Social validity is an evaluation of the treatment goals, procedure and outcomes of an intervention (Kazdin, 1999). In general social validity is concerned with the acceptability of treatment goals and procedures, and the importance of treatment goals and outcomes (Foster & Mash, 1999). These may or may not converge in a social validity evaluation. This study will use a subjective evaluation methodology where the evaluator is asked rate his or her opinion of statements regarding the areas of interest in regard to the client's potential performance. The evaluator provides a subjective and qualitative view of how he or she views any potential in the client 's behaviors or performance. Foster and Mash (1999) explain that there are problems associated with relying on subjective opinions to judge the global importance of treatment effects. They say that such a method is subject to bias and change may be noted where no change in overt behavior occurred. They note also that global change in performance *may* represent a clinically important change; but a global change in behavior or performance does not necessarily mean that the person's functioning has improved as in a clinically significant change. Indeed Kazdin (1999) says that social validity is not necessarily the same as clinical significance; meaning that the practical and applied value of an intervention is not always equitable to the social value placed on the effects, goals or procedures of that intervention.

Foster and Mash (1999) itemize areas that should be included in an evaluation of social validity.

- First the ultimate goals of the intervention should be client driven and be justified through the evaluation.
- Second the clinical significance of the treatment outcomes should be explicitly given recognition.
- Third a social validity should include the feasibility of the treatment implementation beyond the research setting.
- Fourth, the validity of the treatment content must be addressed.
- The fifth item is particularly important when using a subjective evaluation. This item includes the identification of the evaluators: What community or consumer group do they represent: What was the basis for the selection of them; why is this group relevant to the issue; how is the group is a representative sample; and a description of the group characteristics.

This study evaluated the social validity of the dance movement program through the subjective evaluation of the participants, as well as of persons directly and indirectly involved in the daily lives of the participants. Two questionnaires were devised for this purpose. The first questionnaire was completed through a verbal conversation with the participant (see Appendix J). The second questionnaire was three pages with a large size font (see Appendix B).

Participant questionnaire. This verbally given questionnaire consisted of three questions. There was additional space on the form for the evaluator to add comments by the participant. The questions evaluated the participant's subjective opinion regarding his or her responses to the program. The initial question sought out the participant's feelings of enjoyment of lack of enjoyment during the DMT program. This was to guide the participant in the direction sought for evaluation. The following questions queried the 'what' (acceptability) and the 'why' (importance) of the participant's experience of the DMT program. Given a positive response by the participant an additional question was asked regarding the participant's willingness to participate in such a program again.

Concerned persons questionnaire. This questionnaire was expected to draw a much larger sample size than the four participants. The larger sample was to include direct and indirect caregivers at the health centre, administrative support at the health centre, family and friends of the participants. This sample was to include people with various role relationships to the participant, such as health care aids, nurses, patient care managers, unit clerks, spouses, adult children, and interested parties familiar with the participant. Unfortunately constraints of both time and access resulted in a limited sample.

Each individual evaluation was done with a questionnaire. Completing the questionnaire was preceded by completion of a separate consent form (see Appendix C). The questionnaire was relatively short, having brief descriptions of program goals, procedures, and expected outcome, along with 8 statements to be responded to using a Likert Scale Format (Liebert & Liebert, 1995). Four of the eight statements evaluate program acceptability while the other four evaluate program importance. There are also three questions to determine the relationship of the evaluator to the participant.

Data Analysis

The Positive Response Schedule

The data collected was displayed on line graphs. There was one line graph of the behavioral response of each participant's PRS scores, as well as bar graphs showing details of the categories of the PRS scores. The line graphs showed the PRS score for each session of each phase. Using a visual graphical analysis the data was explored to find change in trends, means, variability, levels, and latency.

A consistent difference between phases enhances the ease of visual analysis. This most notable when there is no overlap of data across phases (i.e., when data points from one phase do not approach the data points in the next or preceding phase; Kazdin, 1998). The magnitude of change is noted in change of mean from one phase to the next as well as a change in level from the end of one phase to the beginning of the next phase. Magnitude changes in means show that the data pattern is consistent with SSM (Kazdin, 1998). Magnitude changes in level show that the intervention effect is reliable. Change of level between phases and stability of direction of trend within phases are together visual signs of consistent change. Stability of trend within a phase is when the slope of the graph shows a systematic increase or decrease over time (Kazdin, 1982). Change of direction of trend between phases enhances also the strength of conclusions that can be drawn from a visual analysis. Change of trend and latency of change are both variables of change in the rate of the participant's performance (Kazdin, 1998). When there is no latency there is nearly immediate change in data points from one phase to the next. When there is a latency effect (a slow change in the data points) conclusions regarding the effect of the independent variable are more difficult to assess. The closer to the phase change the change in data points occurs (i.e., little latency) the clearer the intervention effect is considered to be. Analysis of the data from this study was done for both intra-participant and inter-participant comparisons across baseline, independent variable, reintroduction of the baseline condition, and the subsequent reintroduction of independent variable condition.

Data Variability

In conjunction with a visual analysis, the stability of level within phases can be assessed when 80% of data points of each phase fall within 20 % of the median level of that phase, although this may vary with an expected variability

(Dattilo et al., 1993). Kazdin (1982) notes that a large range of intrasubject variability increases the difficulty of visual inspection of data in single-system design. He cautions that small changes in behavior can be important therefore when these are seen over several different persons and an extended period of time the data requires further analysis (Kazdin, 1982). It is with this statement in mind that the variability of the data from the current study was reviewed.

Method. Mean values of the PRS scores were used for an analysis of variability. The mean of the data was chosen because the range of difference between mean and median was relatively low. The range of difference between median and mean was between 0 and 2 percentage points; where those median scores 0.0 - 0.5 percentage points from the mean make up 56.25% of all scores, median scores 0.6 – 1.99 percentage points from the mean make up 25% of all scores, and those median scores 2 percentage points from the mean make up 18.75% of all scores.

Generally, in SSD the researchers are required to ensure that the data points fall within +/-10% of the mean value of the phase; as a judgment of stability of data and to determine phase shifts (Kazdin, 1982; Dattilo et al., 1993, although they use the median). The data collected on all participants rarely met this requirement. Tables 3.1 to 3.4 show the expected range (+/-10% of the mean) of PRS scores for all participants in each phase. The actual range of the PRS data is also shown with denotation of ranges, which fall within +/-10% to 14% of the mean. Patrick's Arousal scores were the only scores consistently

Table 3.1. *The Expected Range (+/-10% of the mean) and Actual Range of PRS Scores for Bev in Each Phase (A, B, A2, B2)*

Bev

	Phase A	Phase B	Phase A2	Phase B2
Overall Score				
Expected Range	36.9 - 45.1	55.8 - 68.2	35.1 - 42.9	48.6 - 59.4
Actual Range	33.0 - 47.0	57.0 - 65.0*	29.0 - 52.0	46.0 - 66.0
Action Score				
Expected Range	61.2 - 74.8	76.5 - 92.5	60.3 - 73.7	72.0 - 88.0
Actual Range	60.0 - 72.0^	78.0 - 91.0*	52.0 - 83.0	73.0 - 93.0
Arousal Score				
Expected Range	12.6 - 15.4	36.0 - 44.0	9.0 - 11.0	25.2 - 30.8
Actual Range	7.3 - 23.0	36.0 - 45.0^^	4.0 - 21.0	19.0 - 39.0

*Within 10% of mean
**Within 11% of mean
^Within 12% of mean
^^Within 13% of mean
#Within 14% of mean

Table 3.2. *The Expected Range (+/-10% of the mean) and Actual Range of PRS Scores for Cassie in Each Phase (A, B, A2, B2)*

Cassie

	Phase A	Phase B	Phase A2	Phase B2
Overall Score				
Expected Range	36.0 - 44.0	45.0 - 55.0	30.6 - 37.4	46.8 - 57.2
Actual Range	30.0 - 48.0	46.0 - 56.0^	28.0 - 42.0	50.0 - 56.0*
Action Score				
Expected Range	57.6 - 70.4	72.0 - 88.0	47.7 - 58.3	69.3 - 84.7
Actual Range	47.0 - 79.0	69.0 - 96.0	47.0 - 68.0	74.0 - 87.0^^
Arousal Score				
Expected Range	14.4 - 17.6	19.8 - 24.2	13.5 - 16.5	24.3 - 29.7
Actual Range	12.0 - 25.0	0.7 - 34.0	7.3 - 19.0	25.0 - 33.0

*Within 10% of mean
**Within 11% of mean
^Within 12% of mean
^^Within 13% of mean
#Within 14% of mean

Table 3.3. *The Expected Range (+/-10% of the mean) and Actual Range of PRS Scores for Rhonda in Each Phase (A, B, A2, B2)*

Rhonda

	Phase A	Phase B	Phase A2	Phase B2
Overall Score				
Expected Range	41.4 - 50.6	46.8 - 57.2	36.0 - 44.0	47.7 - 58.3
Actual Range	41.0 - 53.0	47.0 - 53.0^	35.0 - 50.0	53.0 - 54.0*
Action Score				
Expected Range	62.1 - 75.9	67.5 - 82.5	53.1 - 64.9	73.8 - 90.2
Actual Range	58.0 - 84.0	66.0 - 81.0^	49.0 - 81.0	81.0 - 83.0*
Arousal Score				
Expected Range	20.7 - 25.3	26.1 - 31.9	18.9 - 23.1	22.5 - 27.5
Actual Range	17.0 - 28.0	25.0 - 34.0	19.0 - 22.0*	23.0 - 27.0*

*Within 10% of mean
**Within 11% of mean
^Within 12% of mean
^^Within 13% of mean
#Within 14% of mean

Table 3.4. *The Expected Range (+/-10% of the mean) and Actual Range of PRS Scores for Patrick in Each Phase (A, B, A2, B2)*

Patrick

	Phase A	Phase B	Phase A2	Phase B2
Overall Score				
Expected Range	45.0 - 55.0	45.9 - 56.1	45.0 - 55.0	49.5 - 59.5
Actual Range	47.0 - 54.0*	45.0 - 58.0#	49.0 - 51.0*	53.0 - 57.0*
Action Score				
Expected Range	71.1 - 86.9	72.0 - 88.0	72.9 - 89.1	79.2 - 96.8
Actual Range	74.0 - 87.0**	67.0 - 93.0	80.0 - 83.0*	83.0 - 93.0*
Arousal Score				
Expected Range	18.9 - 23.1	20.7 - 25.3	18.0 - 22.0	19.8 - 24.2
Actual Range	19.0 - 22.0*	21.0 - 25.0*	18.0 - 22.0*	21.0 - 23.0*

*Within 10% of mean
**Within 11% of mean
^Within 12% of mean
^^Within 13% of mean
#Within 14% of mean

within the +/-10% range required for stability. The percentage of number of scores of each participant within a phase that were outside of the acceptable range for stability was from 14.29% to 100%. The mean percentages of scores outside of the acceptable range (across phases and participants) were Overall 43.10%; Action 41.27%; Arousal 55.71%.

Comparative analysis of individual participant's Action and Arousal scores to the same participant's Overall scores showed that the variability of the Action and Arousal scores tend to follow the variability of the Overall score. There are a few exceptions to this pattern. Analysis of these disparities was assisted by an analysis of the magnitude of variability of each participant's PRS scores. Table 3.5 shows the points from the mean score (of Overall, Action and Arousal scores) of each participant's score along with the spread between those scores for each session. Comparison of the spread of these mean scores with the median of the spread for each phase provided a judgment of the magnitude of disparity of the scores for a single session as compared to the participant's session scores for that phase. The median of the spread in a phase was used, as this reflected better the central tendency of the mean scores. The spread of mean scores in a phase was in some cases considerable.

Two additional comments regarding the PRS data variability are required. First, the data collected for all participants showed that the Action score consistently reflected a higher percentage of the Overall score than the Arousal score did (see Figures 4.2, 4.5, 4.8, 4.12 in Chapter Four—Results).

Table 3.5. *Variability of Session Scores as Determined by the Points from the Mean Overall, Action, and Arousal Scores for Each Participant at Each Session*

Bev

	Phase A								Phase B					Phase A2					Phase B2			
	M	M9	M10	M11	M14	M16	M17	M23	**M**	J2	J6	J7	J8	**M**	J11	J12	J13	J14	**M**	J18	J20	J21
Overall	41	6	-3	2	-8	1	4	1	63	-6	2	2	0	39	-1	13	-3	-10	54	-4	-8	12
Action	68	4	-3	3	-8	3	-1	4	85	-8	6	0	1	67	0	16	0	-15	80	-5	-7	13
Arousal	14	7	-3	1	-8	-1	9	-7	40	-4	2	5	1	10	-2	11	-6	-2	28	-3	-9	11
	4	3	0	2	0	4	*10	*11	4	4	4	5	1	5.5	2	5	6	8	2	2	1	2

Cassie

	Phase A								Phase B					Phase A2					Phase B2				
	M	M9	M10	M11	M14	M16	M17	M23	**M**	J5	J6	J7	J8	**M**	J11	J12	J13	J14	**M**	J18	J19	J20	J21
Overall	40	-2	8	1	5	4	-8	-10	51	-5	1	5	-3	34	-6	-3	8	0	52	4	-2	-2	1
Action	64	-4	16	7	7	-1	-17	-10	80	-11	-5	-1	16	53	-4	-6	15	-4	77	10	-2	-4	-3
Arousal	16	-2	1	-4	3	9	1	-10	22	1	8	12	-21	15	-8	1	1	8	27	-2	-2	-1	6
	10	2	16	12	4	10	18	0	13	13	13	13	*37	9.5	4	7	14	12	6	12	0	3	9

Rhonda

	Phase A								Phase B					Phase A2					Phase B2			
	M	M9	M10	M11	M14	M16	M17	M23	**M**	J5	J6	J7	J8	**M**	J11	J12	J13	J14	**M**	J18	J19	J20
Overall	46	1	-1	0	-4	-5	9	7	52	-2	1	-5	6	40	-3	10	-5	-2	53	1	0	0
Action	69	1	3	-2	-9	-11	0	15	75	0	4	-9	6	59	-8	22	-10	-4	82	-1	1	1
Arousal	23	0	-6	2	1	0	5	-1	29	4	-1	-1	5	21	1	-2	0	1	25	2	-2	-1
	9	1	9	4	10	11	9	16	5.5	6	5	8	1	9.5	9	*24	10	5	3	3	3	2

Patrick

	Phase A								Phase B					Phase A2					Phase B2				
	M	M9	M10	M11	M14	M16	M17	M23	**M**	J5	J6	J7	J8	**M**	J11	J12	J13	J14	**M**	J18	J19	J20	J21
Overall	50	4	-3	-1	2	-3	1	0	52	-5	-7	4	6	50	-1	1	0	1	55	2	-2	0	1
Action	79	8	-5	-2	3	-5	1	1	80	-7	-13	7	13	81	-1	2	-1	-1	88	5	-5	1	0
Arousal	21	0	0	1	0	-2	1	0	23	-2	1	2	1	20	-2	0	0	2	22	-1	1	0	1
	3	*8	5	3	3	3	0	1	8.5	5	14	5	12	1.5	1	2	1	3	3.5	6	6	1	1

Note. The +/- points under the dates (i.e., M9 which is May 9; J11 is June 11) represent the integer value that the session score was over or under the mean for that phase. Means for each score (Overall, Action, and Arousal) are in the vertical boxes labeled **M**. The horizontal boxes contain the value of the linear spread of the distances from mean scores for each session. The intersecting horizontal/vertical boxes contain the median value of the spread of the mean scores. Scores marked with an * represent those scores which are more than twice the median value.

This was partly accounted for by the very rare occurrence (one) of a response categorized as Sad and no observation of a response categorized as Fear; these are two of the five response categories of the sub-component Arousal (see Figures 3.1 to 3.4). The sub-component Action did not have any response categories with such a low magnitude of response (see Figures 3.1 to 3.4). The second comment concerns the possible effect of time-of-day on the dependent variable. Figures 4.2, 4.5, 4.8, and 4.12, displaying the PRS scores for each participant during all phases, have asterisks on the dates of sessions to indicate those that were afternoon sessions. A comparative visual inspection of the morning to afternoon sessions did not suggest influence of time-of-day on the participants' responses.

Bev. Comparative analysis of Bev's Action and Arousal scores to her Overall scores showed that the variability of the Action and Arousal scores tend to follow the variability of the Overall score. There are two exceptions to this pattern. These can be seen visually in Figure 4.2 and are noted in Table 3.5, which shows the spread of Bev's scores (Overall, Action, and Arousal) for each session in each phase.

Visual analysis of Figure 4.2 showed that the first disparity was in phase A, session M17, where there was an increase of the Overall score from the previous data point, a decrease of the Action score from the previous data point, and an increase of the Arousal score from the previous data point. Table 3.5

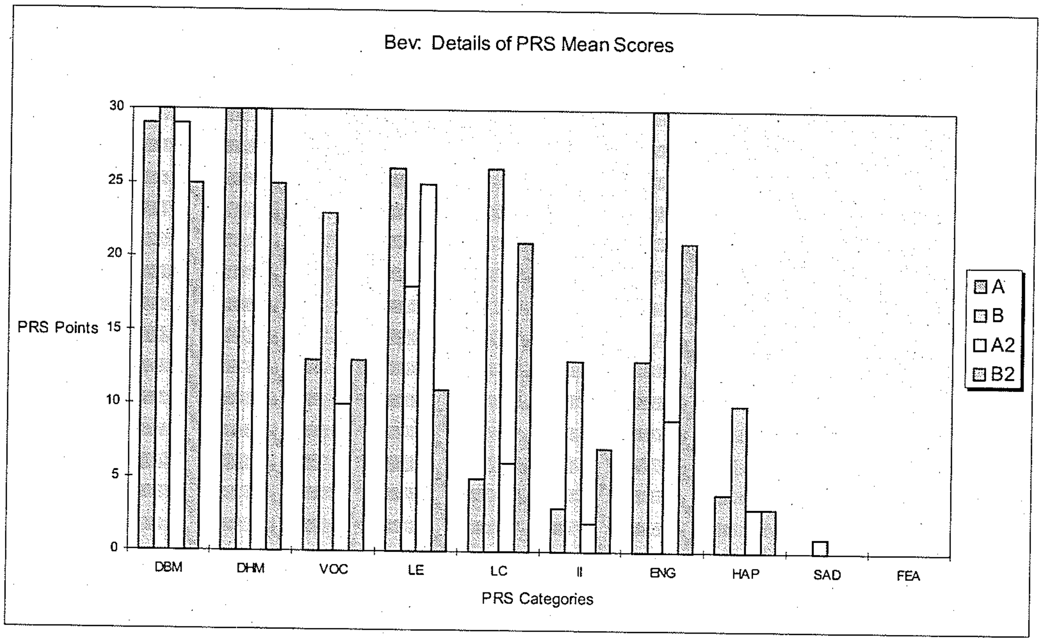


Figure 3.1. Bev's mean Positive Response Schedule points for observation categories are shown for each phase (A, B, A2, B2). The maximum mean points for each category in each phase are 30. Abbreviations for the Action Categories are: DBM-deliberate body movement; DHM-deliberate head movement; VOC-vocalization; LE-looks at environment; LC-looks at carer. Abbreviations for the Arousal Categories are: II-initiates interaction; ENG-engagement; HAP-happy; SAD-sad; FEA-fear.

shows that the spread of Bev's scores on M17 is 10 percentage points, which is more than twice the median spread for that phase. Analysis of the treatment integrity data for the M17 session showed that Bev spent 40% of that session participating in an organized, out-of-doors recreation (also see Figure 4.3). This was the only out-of-doors group recorded during the research project.

The second disparity was also in phase A. This disparity occurred on M23, where the Overall score decreased, the Action score increased, and the Arousal score decreased. Again Table 3.5 shows that the spread of scores on M23, at 11 percentage points, is more than twice the median spread for that phase. Analysis of the treatment integrity data for M23 showed that Bev spent 20% of the observed time intervals in a joint occupational/physical therapy program (group ball bouncing), and 80% of the observed time intervals sitting alone.

Another phase where a score disparity seemed visible among the Overall score and sub-components is in phase B. Session J6 shows Bev to have had moderate increase in the Overall and Arousal scores, while the Action scoreappeared to have increased substantially. Again there appeared to be some minor disparity between the direction of scores at sessions J7 and J8, as well as at J 14 in phase B2. However Table 3.5 shows that the spread of Bev's scores at those sessions were within twice the median of the spread of scores for that phase.

Cassie. Comparative analysis of Cassie's Action and Arousal scores to her Overall scores showed considerable variability. Table 3.5 shows that Cassie's scores have the largest spread of distance from the mean of all the participants. Analysis of logbook entries indicated that Cassie's sentiments and willingness to participate varied greatly over the research project (see Table 3.6). Despite this large range of scores, Cassie's Action and Arousal scores tend to follow the variability of the Overall score. There was only one exception to this pattern. This can be seen visually in Figure 4.5 of Cassie's PRS scores and is noted in Table 3.5, which shows the spread of distances from the mean of Cassie's scores (Overall, Action, and Arousal) for each session in each phase.

Visual analysis of Figure 4.5 showed that a disparity between the PRS Overall and sub-component scores occurred in phase B, session J8. During that session there was a decrease of the Overall score from the previous data point, while there was a large increase of the Action score from the previous data point, and a large decrease of the Arousal score from the previous data point.

Table 3.5 shows that the spread of Cassie's scores on J8 is 37 percentage points, which was more than twice (nearly three times) the median of the distances from the means for that phase. Consultation of the logbook showed that Cassie did not cooperate with the dance movement therapist at that session. The logbook entry stated that Cassie was "...angry and sullen but

Table 3.6. *Comments Regarding Cassie Taken from Research Logbook*

Phase A

M9	"Cassie was certainly disturbed (by our presence). She went into her room and closed her door!"
M11	"Cassie was having a difficult day.... This developed into general agitation which continued to be irritated by the presence of the observers....Cassie became angry and went into her room and closed her door."
M16	"Cassie was very pleasant today. She was telling (other participant) about people watching her (the observers were explained to her)....She was smiling and said she had never noticed them before. (the research was explained to her) This time she seemed pleasantly interested and somewhat amused."
M17	"Cassie was sleepy..."
M23	"Later in the session Cassie (upset at not being able to contact her son was wreaking havoc at the nursing station—mouthing off etc.) decided to remove herself from observation....later when she came out she was dozing."

Phase B

M31	"Cassie and (other participant) were waiting pissed off and frustrated... they were in no good mood. Also I heard later that Cassie had been like that (angry) all morning....Cassie and (other participant) were not to be engaged—they sat angrily." **This session was not used as data for these two participants.
J2	"Cassie was still in a sour mood so we left her alone." **A session was not attempted with Cassie on this day.
J5	"We came in today to do a first DMT with Cassie. She enjoyed the individualized attention very much."

Table 4.7. *Comments Regarding Cassie Taken from Research Logbook* continued

J6	"Cassie thoroughly enjoyed today again."
J7	"Cassie once again was a pleasure to dance with and enjoyed herself greatly."
J8	"Only Cassie was unwilling to participate today. She was angry and sullen..."
Phase A2	
J11	"Cassie spent a fair bit of time snoozing."
J13	"Cassie was having bowel problems."
Phase B2	
J18	Cassie was "...much more subdued than at the beginning of the project. She asked about her son frequently during the session. When I asked her if she enjoyed the session she replied: Yah, I guess so."
J19	Cassie "...asked quite often about her son but then settled into the session with her bemused look."
J20	Cassie was "...sitting and anticipating the session. She was eager to dance today....she was slightly subdued but did not talk as much about her son or being confused by her living here."
J21	Cassie was happy to participate and said she was sorry it was going to end..."

remained sitting in the TV room with me while I talked with her" (June 8, 2001). Therefore the session comprised of a conversation rather than the planned dance movement program.

Analysis of the PRS raw scores for the J8 session (see Appendix K) revealed that, in the category *Looks at environment*, Cassie scored 92% above the mean score from the previous three sessions of DMT; thus there was a large increase in the Action score for the J8 session (see Figure 4.5). Note that this increase in *Looks at environment* did not coincide with a decrease in *Looks at carer*. Further, the raw scores indicated a 100% decline over the previous three-day mean for both the *Engagement* and *Happy* categories. The raw score for the category *Initiates interaction* showed a decrease of 30% over the previous three-day mean. These last three categories, along with *Sad* and *Fear* make up the sub-component Arousal. This analysis accounted for the very large decrease in Cassie's Arousal score for J8 (see Figure 4.5).

The analysis of Bev's scores revealed that for Bev the categories *Looks at environment* and *Looks at carer* tended to be inversely related (see Figure 3.1); overall when one was high the other was low, or lower. Cassie's scores showed less consistency in this pattern than Bev's scores showed. The J8 session mentioned above is one instance where the pattern was reversed for that phase (B). Two other sessions where this reversal occurred were J12 and J13 in phase A2 (see Appendix K). Figure 4.7 shows that during those sessions

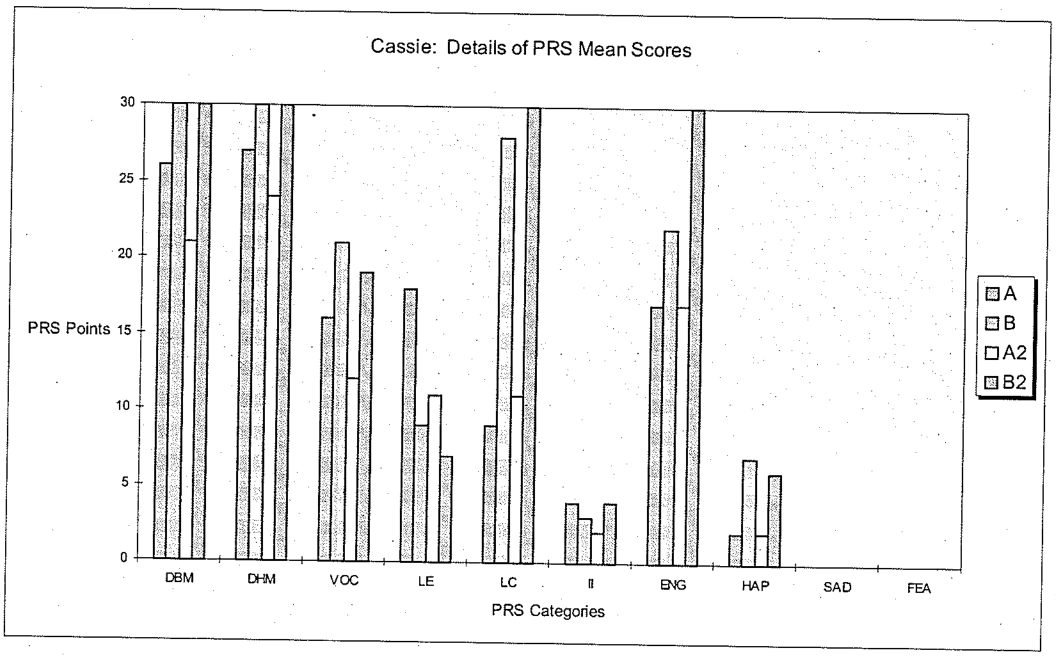


Figure 3.2. Cassie's mean Positive Response Schedule points for observation categories are shown for each phase (A, B, A2, B2). The maximum mean points for each category in each phase are 30. Abbreviations for the Action Categories are: DBM-deliberate body movement; DHM-deliberate head movement; VOC-vocalization; LE-looks at environment; LC-looks at carer. Abbreviations for the Arousal Categories are: II-initiates interaction; ENG-engagement; HAP-happy; SAD-sad; FEA-fear.

(J12 andJ13) Cassie spent more time in occupational/physical therapy and family visit, respectively, than during any other baseline session. Despite this variability among sessions the overall pattern of higher—*Looks at environment* and lower—*Looks at carer* in baseline phase, with the pattern reversing for intervention phase, is still visible in Figure 3.2 of Mean PRS Scores.

Rhonda. Comparative analysis of Rhonda's Action and Arousal scores to her Overall scores revealed substantial variability throughout. However Table 3.5 shows that at only session J12 did Rhonda score twice the median of the range of means for that phase. This significant deviation from the overall variability of her scores can be somewhat accounted for by the type of organized recreation activities she was engaged in during that session. Although Figure 4.10 shows that Rhonda's recreation activity at session J12 was not unusual for that phase (A2), Rhonda did spend more time that session interacting with a caregiver than during other sessions in that phase. Analysis of the treatment integrity checklists showed that Rhonda was involved in four distinct types of organized recreation at that session (J12). These four types were:

1. Listening to poetry.
2. Sorting of papers for staff.
3. Music and massage group.
4. Organized one-on-one and group conversations.

Only one minute of recreation time during that session was spent in another activity (coffee break). Figure 4.1, which displays Rhonda's recreation types, shows that over all of Rhonda's recreation types organized recreation made up only 46% of Rhonda's recreation time. For the session J12 the organized recreation listed above made up 92.86% of Rhonda's recreation time. This unusual amount of organized recreation time, which involved additional time interacting with a caregiver, was useful to account for the much higher than mean score for the session J12 in phase A2 (see Figure 4.8).

Despite this spike in the Overall and Action scores for session J12, it was notable that the Arousal score did not display a similar spike. Rhonda's Overall and Action scores can be seen to follow a tighter pattern than seen with the Overall and Arousal scores (also see phase changes in Figure 3.3 of Rhonda's mean PRS points). Generally, Rhonda's Arousal scores did not follow her Overall and Action scores. This difference is a break in the pattern of change in Overall, Action, and Arousal scores seen in the data for Bev and Cassie.

Patrick. Comparative analysis of Patrick's Action and Arousal scores to his Overall scores revealed little variability throughout. Unlike the scores for the other participants, Patrick's scores (particularly his Arousal scores) were quite stable throughout the research project. Figure 3.4 of the percentage of the possible range of PRS score for each participant illustrates this point. Additionally Table 3.5 shows that only on the first day of data collection did

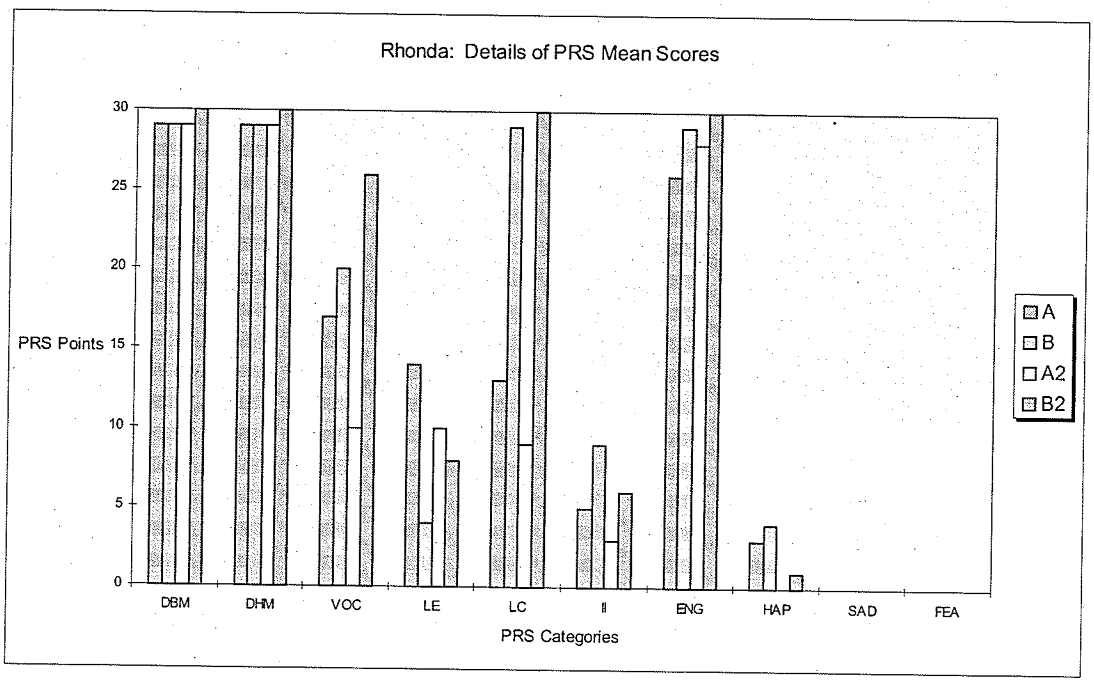


Figure 3.3. Rhonda's mean Positive Response Schedule points for observation categories are shown for each phase (A, B, A2, B2). The maximum mean points for each category in each phase are 30. Abbreviations for the Action Categories are: DBM-deliberate body movement; DHM-deliberate head movement; VOC-vocalization; LE-looks at environment; LC-looks at carer. Abbreviations for the Arousal Categories are: II-initiates interaction; ENG-engagement; HAP-happy; SAD-sad; FEA-fear.

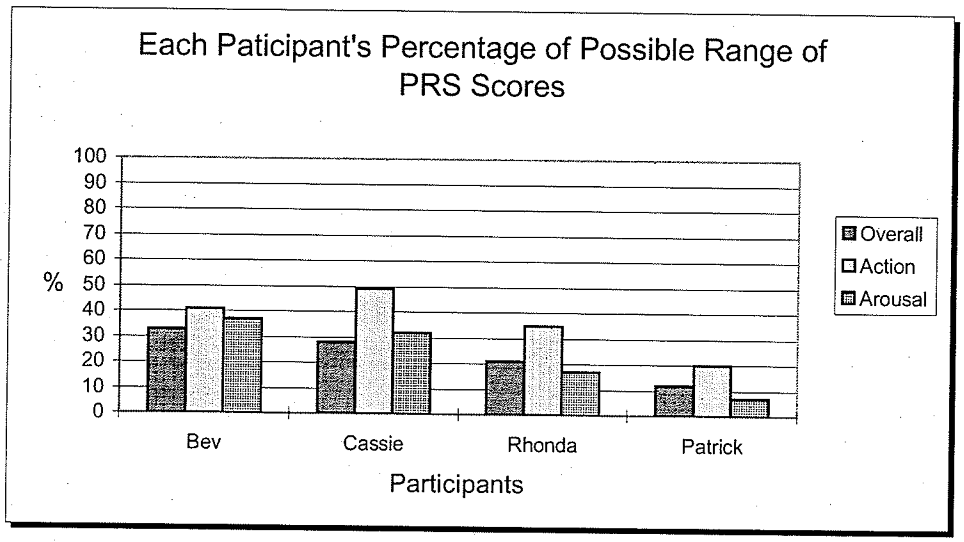


Figure 3.4. Shows each participant's range (lowest to highest) of PRS scores as a percentage of the possible 100% of PRS scores (Overall, Action, and Arousal).

Patrick's scores range beyond twice the median of the ranges for that phase (A). This being the first day Patrick had encountered the observational protocol, it was reasonable to assume the wider range of scores related to this new condition for Patrick. A certain amount of the stability of Patrick's scores may have been an artifact of the measurement tool. Since Patrick spent a great deal of his time during baseline (Daily Activity) sessions humming to his self, he scored high in the categories which made up the sub-component Action; as well as in the *Engagement* category (see Figure 3.5). This affected similarly his Overall score. Although Patrick continued to hum during the intervention (DMT) sessions this behavior was not scored as *Engagement* for those phases (B and B2). Only Patrick's engagement with the dance movement was scored as *Engagement* during phases B and B2. Therefore Patrick's "compulsive" humming (see Table 3.7) may have greatly inflated his real engagement with daily activity (as a positive response). The comparison between phases may not reflect a valid assessment of Patrick's responses to the different conditions (baseline and intervention).

Table 3.7 of comments regarding Patrick, taken from the logbook also informs that Patrick had difficulty breathing during DMT sessions. Patrick's breathing condition may have made it difficult for the assistants to determine Patrick's responses regarding the category *Happy*. Table 3.8 of the PRS behavior category criteria defines *Happy* such that much of Patrick's expression of this emotion may have gone unrecorded. The emphasis upon smiling and animated expression was likely the problem, because when Patrick had difficultly breathing he usually kept his lips pursed. This situation may have also resulted in less variability of Patrick's PRS scores.

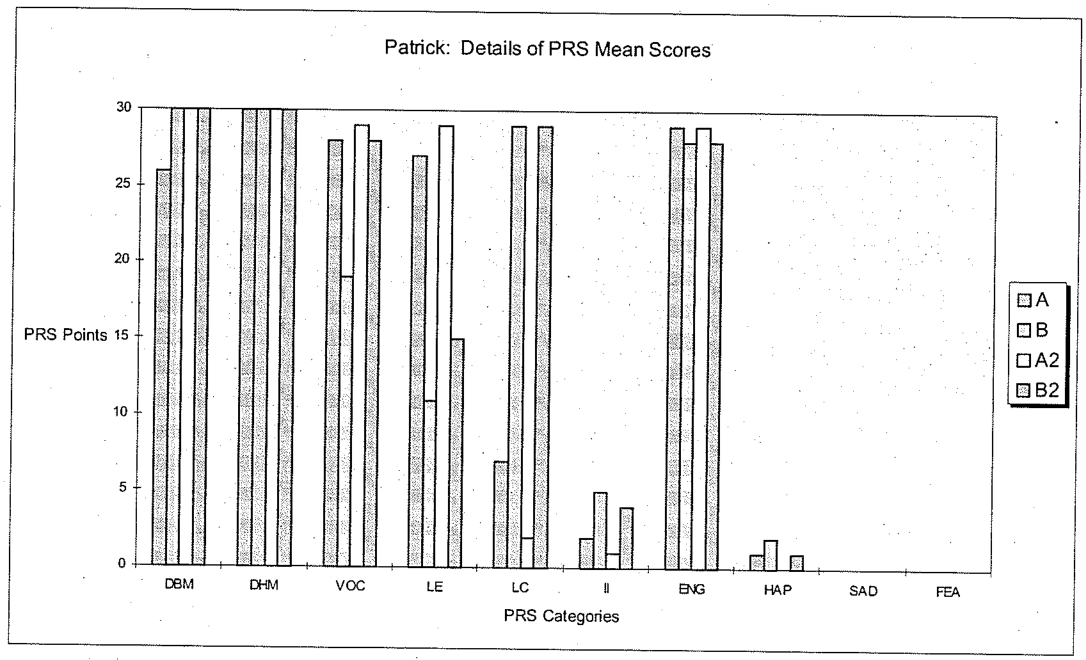


Figure 3.5. Patrick's mean Positive Response Schedule points for observation categories are shown for each phase (A, B, A2, B2). The maximum mean points for each category in each phase are 30. Abbreviations for the Action Categories are: DBM-deliberate body movement; DHM-deliberate head movement; VOC-vocalization; LE-looks at environment; LC-looks at carer. Abbreviations for the Arousal Categories are: II-initiates interaction; ENG-engagement; HAP-happy; SAD-sad; FEA-fear.

Table 3.7. *Comments Regarding Patrick Taken from Research Logbook*

Phase A	
M23	"... Patrick's humming seems to disturb many residents and staff, but he stops this when engaged in conversation. However no real effort is made to engage him or to promote this with the residents."
Phase B	
M31	"Patrick would not stop humming and after being asked politely by me several times and by (other participant) belligerently, to stop, he (Patrick) asked to leave (the session)." (No data collection.)
J2	"Patrick participated actively and said he really enjoyed it (individualized DMT). He hummed only briefly. He was distracted once by something going on with another resident. This caused Patrick to exclaim he would punch that guy right in the nose!"
J6	"Patrick has great difficultly breathing, so needs some adaptation to seated movement. Patrick hugged me after the session."
J7	"The TV room was being used so we had Patrick's session in the hall next to it. This was unfortunate as he was greatly distracted. He also was having even more difficulty breathing and most of the session was adapted."
J8	"Patrick is quite sensitive to the ostracism of him on the unit."
Phase A2	
J14	"Patrick on the other hand spent most of the PM alone at the dining table. However there were few residents to staff."(Most residents were at an an Event.)
Phase B2	
J18	Patrick did not want to go into the TV room today. "So we stayed in the hallway seating area. This was unfortunate as it was very distracting for him."
J19	"Patrick would not do into the TV room--he said it spooked him. Out in the hall he was fairly distracted. He would not stand up today."

Table 3.7. *Comments Regarding Patrick Taken from Research Logbook* continued

J20	"Patrick was ready when we arrived. As we prepared the room, (assistant) talked with Patrick and guided him into the TV room to look out the windows, at the trees. This seemed to calm Patrick and when I came in the room he 'recognized' me and anticipated something good. We did the session in the TV room without any problem. Patrick had only some problem breathing. He participated standing today; but was not able to initiate much of his own movement."
J21	"Patrick participated in the TV room without concern. He seemed to thoroughly enjoy himself. Patrick surprised me with his social validity answers."

Table 3.8 Positive *Response Schedule Behavior Category Criteria*

(1) *Deliberate body movement* [THINK-*BODY*]
Any deliberate movement of trunk or limb, including postural movement. Involuntary or automatic movements such as tic or tremor should be discounted.

(2) *Deliberate head movement* [THINK-*HEAD*]
Any deliberate movement of head, discounting involuntary/automatic movements as above.

(3) *Vocalization* [THINK-*SOUND*]
Any verbal or vocal utterance, to include speech, singing or unidentifiable noises.

(4) *Looks at environment* [THINK-*ENVIRONMENT*]
Any deliberate turning to and/or following of observable stimuli in the environment; to be differentiated from vacant gaze. (Any following of the observer to be recorded under this category.) Example: turning to look at a door being opened, noticing a nearby argument, watching a neighbor's game of dominoes.

(5) *Looks at carer* [THINK-*CARER*]
Any deliberate turning to and/or following the carer. Only record in this category for carers engaged in a personal intervention with the client. Example: a carer calls the client's name and the client's eyes move to meet the carer's (Looking at carers not involved in a personal interaction should be recorded under 'looks at environment'.)

(6) *Initiates interaction* [THINK-*INITIATES*]
Any attempt to initiate interaction or obtain attention by either vocal or non-vocal means; that is, by facial, bodily or vocal gestures to another. Example: a client reaches a hand towards a nurse, stammering out a repeated syllable; a client goes to pat the hand of another who appears upset.

(7) *Engagement* [THINK-*ENGAGED*]
Any absorbed commitment (passive or active) to some activity. Example: singing; following the movement of a hand massage; participating in exercise; having an extended conversation.

Table 3.8 Positive *Response Schedule Behavior Category Criteria* continued

(8) *Happy* [THINK-*HAPPY*]
Smiling animated facial expression in the absence of signs of unhappiness (see below). *Do not record in this or the following two categories unless there is a clear observable change from the norm.*

(9) *Sad* [THINK-*SAD*]
Downcast facial expression; that is, mouth turned down, eyes lowered, tearfulness.

(10) *Fear* [THINK-*FEAR*]
Facial or bodily expression of fear; that is, widening of the eyes, rapid head/eye movements, sharp intake of breath, bodily 'jumping' or recoiling.

From Perrin (1997) with comments in [ ] mine.

RESULTS

Reliability

Interobserver Agreement

The Interobserver agreements for the PRS observational scoring of each participant over the four phases were as follows: Rhonda- 87.33% (agreement measured for 17 of 18 sessions; phase- A at 82.26%; B at 86.84%; A2 at 90.49%; B2 at 89.75%; overall range- 71.13% to 95.99%); Patrick- 91.62% (agreement measured for 17 of 19 sessions; phase- A at 88.55%; B at 88.06%; A2 at 96.83%; B2 at 93.06%; overall range- 81.27% to 100%); Cassie- 87.43% (agreement measured for 17 of 19 sessions; phase- A at 83.41%; B at 91.49%; A2 at 85.75%; B2 at 89.09%; overall range- 76.04% to 94.66%); Bev- 81.98% (agreement measured for 16 of 19 sessions; phase- A at 83.56%; B at 76.98%; A2 at 88.38%; B2 at 79.01%; overall range- 74.27% to 95.62%).

Treatment Integrity

DMT Sessions

The treatment integrity for all four participants, over both intervention phases was 88.65%; this includes the session during which Bev was only somewhat ill. The treatment integrity would be 78.68% if including both sessions during which Bev was sick, or 97.56% if excluding both sessions during which Bev was sick. Excluding the treatment integrity scores for Bev the range of the remaining treatment integrity is 94.12% to 100%. The range of treatment integrity for Bev is 8.82% to 94.12%.

When a section of the DMT program plan did not occur within a session, a deviation from the intervention plan was considered to have occurred. During sessions with Patrick there were two sections of the DMT program plan in which deviations occurred. These deviations were in Partnered Dance Steps -Turning (basic and advanced sequences), -Crossing Step (advanced sequence). Deviations from the intervention plan which occurred with Bev were in the sections Seated Warm-Up -Knee Lift and Leg Stretch (advanced sequence) and Partnered Dance Steps -Crossing Step (advanced sequence); as well as for 64.70% of the intervention plan for session J20, and 91.18% of the excluded session J19. There were no deviations from the DMT program plan for Rhonda and Cassie; thus treatment integrity for sessions with each Rhonda and Cassie was 100%. Treatment integrity was measured for the following number of sessions: Rhonda- 1of 7; Patrick- 2 of 8; Cassie- 2 of 8; Bev- 3 of 8.

Daily Activity Sessions

The data collected for treatment integrity of Daily Activity sessions reveal what “daily activity” entailed for each participant. This data is presented in the *Intrasystem Analyses* (see Figures 4.3, 4.4, 4.6, 4.7, 4.9, 4.10, 4.13, 4.14). Bar graphs are used to show the number of one-minute periods of each participant’s involvement in each measured baseline activity for both baseline phases. Time was measured as one minute for any occurrence of the observed activity during that one minute. The total number of minutes measured during each observation session was 15. Additionally, Table 4.1 highlights the mean score of each individual for selected categories of the treatment integrity checklist. Comparisons between phase A and phase A2 showed that for the *conversing*, *interacting with resident*, and *interacting with caregiver* there was, in general, a decrease of activity in the second baseline phase. However, the treatment integrity category *recreation*, which was comprised of a variety of activities, showed a general increase of activity. The types of recreation activities varied from participant to participant. Some of the activities were participant-initiated while others activities were initiated by family or SCU staff. Figure 4.1 shows the distribution of these types of recreational activities for each participant. Each distribution represents 100% of the participant's total time in recreational activity (total time varies from participant to participant); inclusive of both baseline phases (A and A2) where time was measured as one minute for any occurrence of the observed activity during that one minute of observation. *Magazine* represents time spent looking at newspapers and magazines, *Reading* represents time spent reading (not being read to), and *Organized Activity* represents time spent in a recreation activity organized by the recreation staff.

Table 4.1.

Mean Percentage of Time Spent by Each Participant in Selected Baseline Activities

Participant	Activity	Phase A mean %	Phase A2 mean %
Bev			
	Recreation	8.57	18.33
	Conversing	15.24	13.33
	Interacting with resident	34.28	10
	Interacting with caregiver	20.95	10
	Family visit	0	13.33
Cassie			
	Recreation	16.19	16.67
	Conversing	26.67	23.33
	Interacting with resident	26.67	10
	Interacting with caregiver	20.95	10
	Family visit	2.86	16.67
Rhonda			
	Recreation	62.86	93.33
	Conversing	39.05	23.33
	Interacting with resident	14.28	6.67
	Interacting with caregiver	61.9	33.33
	Family visit	0	0
Patrick			
	Recreation	20	20
	Conversing	8.57	6.67
	Interacting with resident	0.95	0
	Interacting with caregiver	27.62	13.33
	Family visit	0	0

Note. Time was measured as one minute for any occurrence of the observed activity during that one minute.

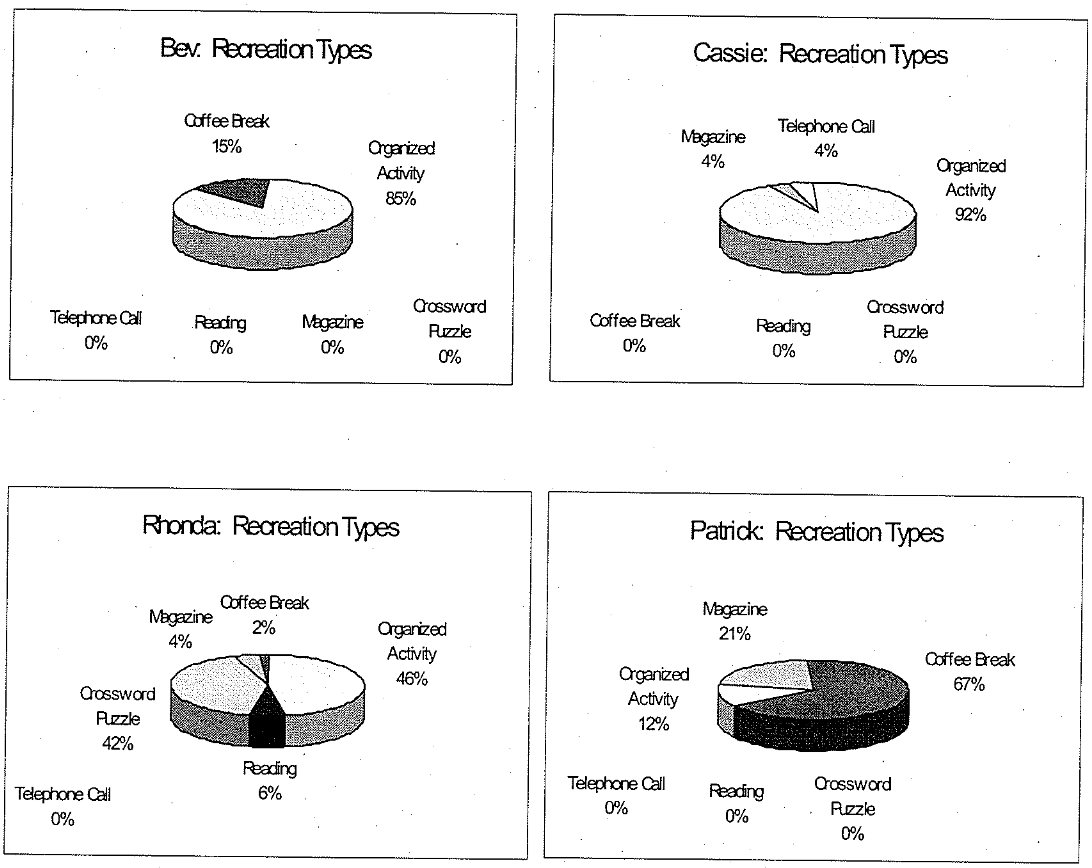


Figure 4.1. The distribution of the six types of recreational activities observed. Each pie chart represents the distribution for one participant. Each distribution accounts for the 100% of time spent in all recreation observed for that participant during both baseline phases A and A2.

Positive Response Schedule

Observational data was gathered for one dependent variable, which was comprised of sub-categories. The dependent variable, PRS score, was analyzed as a single overall score which included two sub-components each subsuming half of the categories of the PRS score. The Overall score represents the percentage of the total possible PRS points (300) for each session. The Action and Arousal scores represent each a percentage of half the total possible PRS points (150 points which each represent half of the PRS categories).

PRS Overall, Action, and Arousal scores are displayed visually with line graphs for each participant (see Figures 4.2, 4.5, 4.8, 4.12). To determine the effect of the independent variable, the dance movement therapy (DMT) program, all observational data are analyzed with graphical analysis. The following criteria (Kazdin, 1982) for the visual inspection of a graphical display of data were used: Mean, level, trend, latency, overlapping data, change in variability, and overall pattern. The PRS data was also analyzed with regard to individual categories of the PRS, treatment integrity data and dance movement therapy logbook entries. This additional data was used to substantiate or clarify the visual analysis of the PRS data.

The analysis began with an intrasystem perspective followed by an intersystem perspective as required by direct intersystem replication in Single-

System Methodology (SSM). The results of both analyses are reported first with regard to the PRS Overall scores and second with regard to the PRS sub-component scores.

Intrasystem Analyses

The following results are presented for the individual cases of the single system design. Each case was analyzed with reference to the mean, level, trend, and latency of the data; as well as to overlapping data points, and the overall pattern of the data across all phases and with regard to sub-components.

Bev

Overall score. Figure 4.2, a graphical display of Bev's PRS scores, shows a clear change in mean across all baseline and intervention phases for the PRS Overall score of Bev. The mean Overall scores for each phase were: A—41; B—63; A2—39; B2—54. This increase in mean PRS Overall score with the introduction of the intervention and subsequent decrease at the return to baseline activities suggested a positive response by Bev to the intervention. This change in mean was strengthened by an accompanying change in level from the end of each phase to the beginning of the next phase. Together these changes in mean and level suggested that Bev's responses changed in magnitude upon the introduction and withdrawal of the intervention. Visual analysis of the data points at the end and beginning of each phase revealed

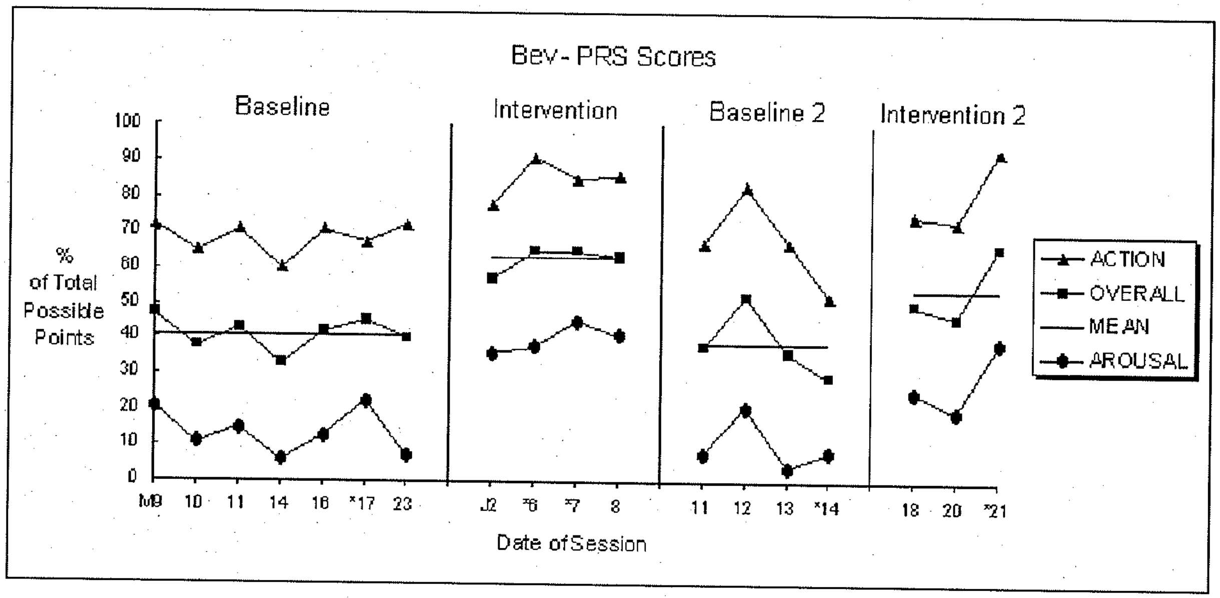


Figure 4.2. Bev's Positive Response Schedule scores for each session of the two baseline and two intervention phases. Dates marked with * were afternoon sessions; all unmarked dates were morning sessions.

relatively no latency of change between phases. This immediate change between phases suggested that Bev's responses changed in rate upon the introduction and withdrawal of the intervention. The lack of trend (or slope) in the data showed that there was not any gradual increase or decrease of rate of response by Bev to the intervention. This immediate change of rate of response strengthened also the appearance of an intervention effect.

There did not appear to be any true trend in the data, rather only expected and accountable variability. Although there was some variability of PRS score within each phase there was little overlapping of data points. Overlap of data points did occur at session J12 (phase A2) and at session J20 (phase B2). Bev's higher PRS score on the J12 session was partly explained by a family visit of Bev with her daughter that lasted for 53.33% of the measured time intervals of that session (see also Figure 4.4). Bev's lower PRS Overall score on the J20 session was mostly accounted for by her illness, which began the day before (J19) and was obviously still present, but less acute, at the J20 session.

The changes noted by the visual criteria from baseline to intervention phase were repeated from the initial to the subsequent set of phases creating an overall pattern of intervention effect. Thus a clear pattern of intervention effect was seen in the visual display of Bev's Overall scores; whereby this influence on Bev's responses was considered be positive.

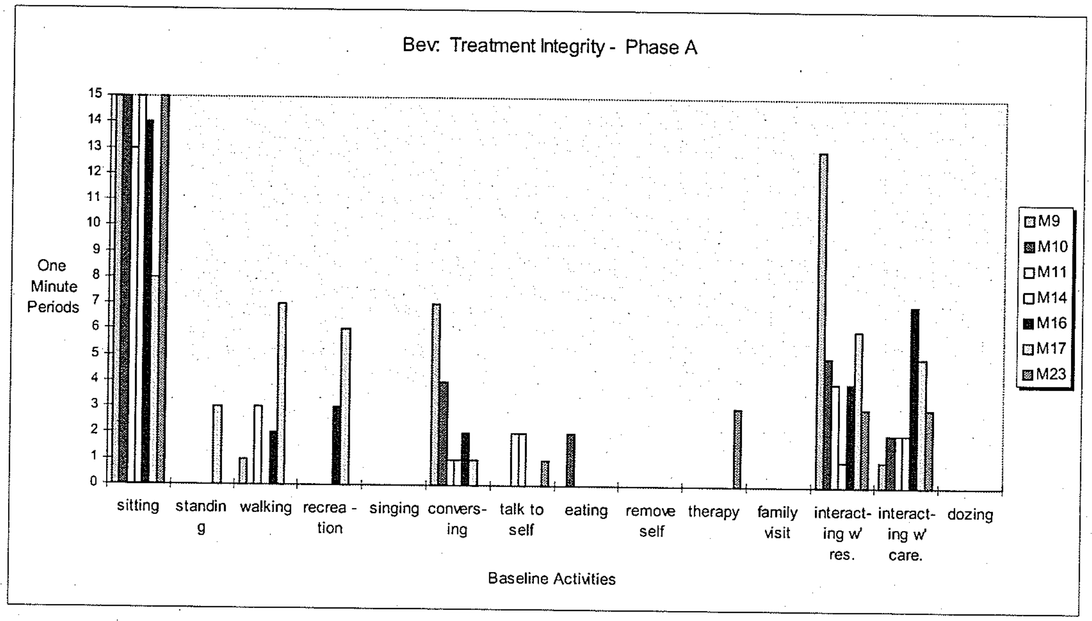


Figure 4.3. The number of one-minute periods of Bev 's involvement in each measured baseline activity for every session of phase A. Each color of bar corresponds to the date of the session where M stands for May. Abbreviations *w'*, *res.*, and *care.* stand for with, resident, and caregiver respectively.

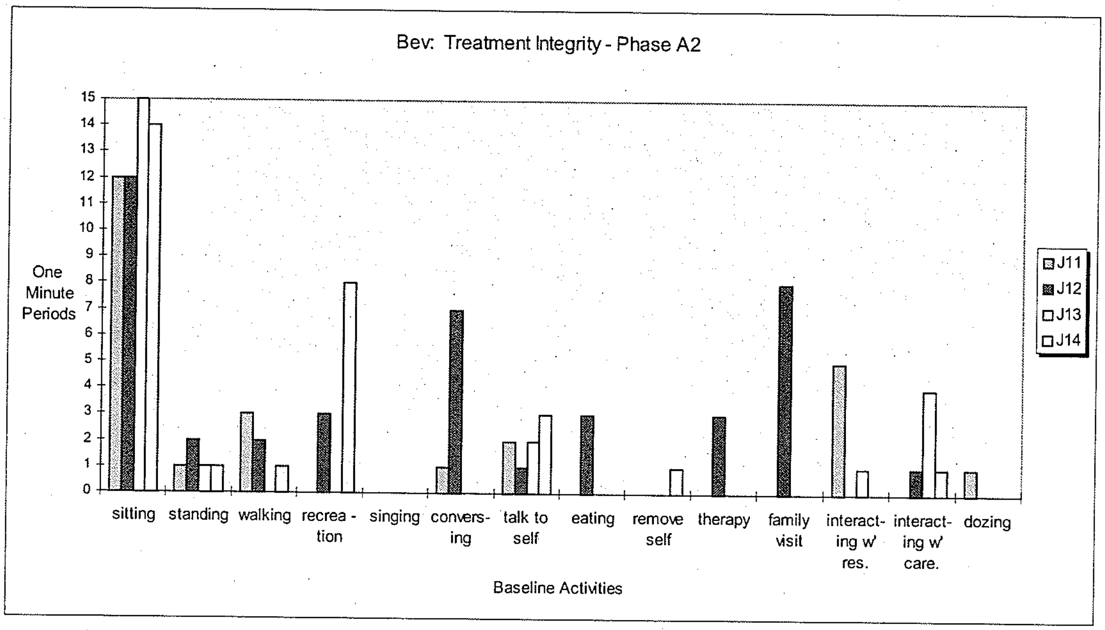


Figure 4.4. The number of one-minute periods of Bev 's involvement in each measured baseline activity for every session of phase A2. Each color of bar corresponds to the date of the session where J stands for June. Abbreviations *w'*, *res.*, and *care.* stand for with, resident, and caregiver respectively.

Sub-Component scores. The mean Action scores for Bev, for each phase were: A—68; B—85; A2—67; B2—80. The mean Arousal scores for Bev, for each phase were: A—14; B—40; A2—10; B2—28. Since the Action and Arousal scores followed, for the most part, the Overall scores, the same data pattern existed for these sub-components as for the Overall score. Therefore the visual analysis of the Action and Arousal scores for Bev showed a similar pattern in mean, level, trend, latency, and overlapping data points as was seen for Overall score. A more detailed analysis of these sub-components was done using Figure 3.1, which shows Bev's mean points for each category in the PRS for each phase.

This analysis showed that most of the change from baseline to intervention of the Action score could be accounted for by change in the categories *Vocalization* (VOC), *Looks at environment* (LE), and *Looks at carer* (LC). Similarly, most of the change from baseline to intervention of the Arousal score could be accounted for by change in the categories *Initiates interaction* (II), *Engagement* (ENG), and *Happy* (HAP).The categories LE and LC were found to be nearly mutually exclusive. Therefore Bev's responses showed an opposing direction of change for these categories from phase to phase; with Bev having an increased response to the environment during the baseline (and decrease during intervention), and increased response to the carer during the intervention (and decrease during baseline). However Figure 3.1 shows also that the magnitude of difference for the category LC is substantially greater from baseline to intervention than is seen in LE intervention to baseline.

Within the sub-component Action the category VOC showed a similar increase of response from baseline to intervention. Taking into account Bev's illness during phase B2 the evidence for increased vocalization by Bev during the intervention is strong.

The sub-component Arousal showed a similar pattern of effect as that seen in Action. The magnitude of this effect can be seen, in the large difference of means from baseline to intervention, in the categories II, ENG, and HAP; again taking into account Bev illness during phase B2.

All changes in the PRS categories of Bev's score occurred for both the initial and subsequent sets of phases. This analysis of the details of sub-component categories strengthened the determination of a significant effect of intervention upon Bev's responses as seen in Figure 4.2, Bev's PRS scores.

Cassie

Overall score. Figure 4.5 a graphical display of Cassie's PRS scores, shows a positive change in mean from the two baseline phases to the two intervention phases for Cassie's PRS score. The mean Overall scores for each phase were: A—40; B—51; A2—34; B2—52. Similar in pattern to Bev's scores, Cassie's Overall scores show an increase in mean response from baseline to the introduction of the intervention, a subsequent decrease in mean response at

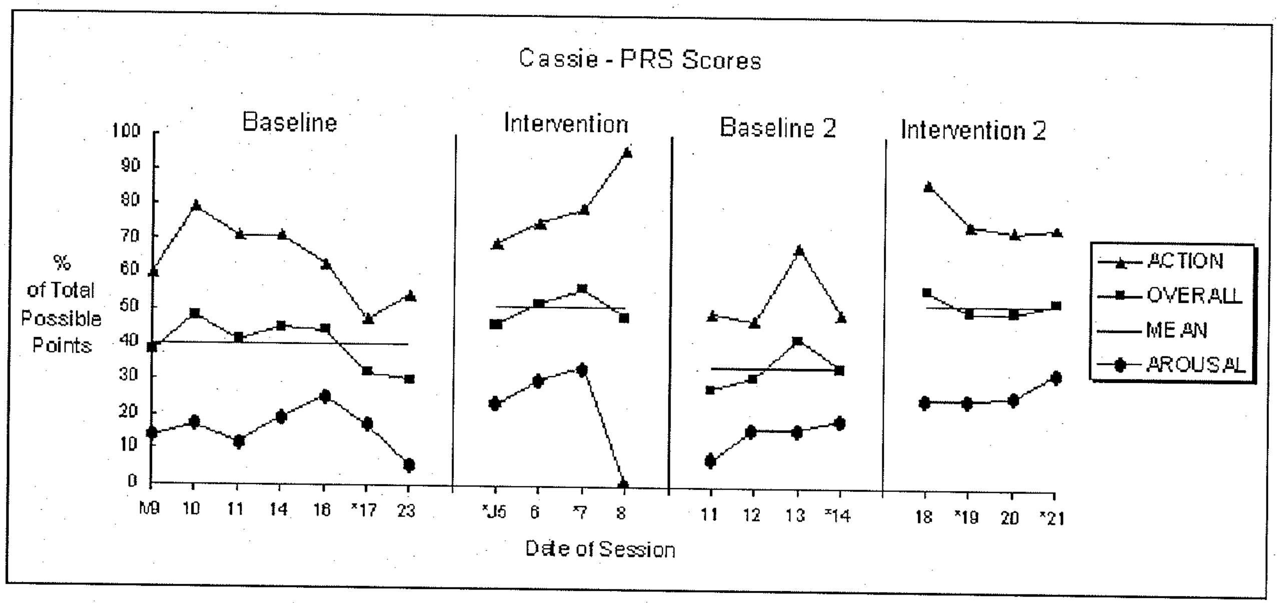


Figure 4.5. Cassie's Positive Response Schedule scores for each session of the two baseline and two intervention phases. Dates marked with * were afternoon sessions; all unmarked dates were morning sessions.

the return to baseline activities, and again an increase in mean response with the reintroduction of the intervention. This suggested a positive response by Cassie to the intervention. Figure 4.5 shows that the change in magnitude, as seen by the change in level of the Overall scores, was a similar change to that seen in the mean. The changes in mean and level suggested that Cassie's responses varied in magnitude upon the introduction and withdrawal of the intervention. These variations are repeated across each set of baseline and intervention phases.

Visual analysis of the data points at the end and beginning of each phase revealed relatively no latency of change for the Overall score between phases This immediate change between phases suggested that Cassie's rate of response changed upon the introduction and withdrawal of the intervention.

Trend is another measure of rate of response. Phase A appeared to have a slight downward trend of the data points, while a slight upward trend of the data points appeared in phase B (excepting J8 which will be elaborated on within the sub-components section). This trend (or slope) in the data showed that there was a gradual decrease of rate of response by Cassie during the first baseline period and an increase of rate of response by Cassie during the first intervention period. These trends are not clearly visible in phases A2 and B2.

The possible upward trend, somewhat visible in phase A2, is mostly accounted for by the J13 session when Cassie had a family visit for 40% of the observed time (her longest visit observed; see Figures 4.6 and 4.7). However any report of a trend in Cassie's Overall scores must be tempered by the significant variability of her data points; as mentioned in Chapter 3—Methods (see page 179). Most importantly, an obvious trend was not repeated in the second set of phases. Therefore these possible trends, in phase A and phase B, were considered to be of negligible significance. Although Cassie's responses were quite variable these became less so during phases A2 and B2 (see Table 3.5 of the percentage of possible range of each participant's PRS scores). This stabilization of response by Cassie may have accompanied her gradual accommodation of the presence of the research team. Thus the determination, that the possible trends in phase A and B were not significant, was strengthened by the greater stability of data in phase A2 and B2; as well as by the lack of latency seen in Cassie's Overall scores for all phases. Lack of latency suggested that Cassie's rate of response changed with the introduction and withdrawal of the intervention.

Although Cassie's scores showed a large amount of variability there were no overlapping of data points within the second set of phases. Overlap of data points did occur at session M10 (phase A) and at session J5 and J8 (phase B). Figure 4.6 shows that on M10 only, a family visit for 20% of observed time stands out as a different baseline activity from the other sessions in that phase. The slightly lower score at session J5 may have resulted from this session being

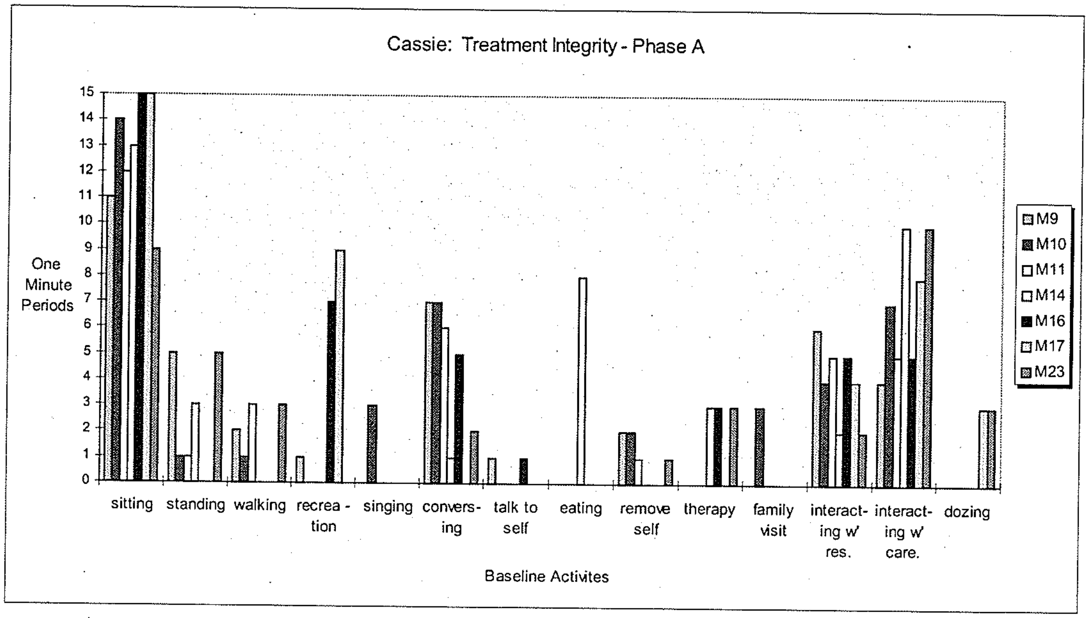


Figure 4.6. The number of one-minute periods of Cassie's 's involvement in each measured baseline activity for every session of phase A. Each color of bar corresponds to the date of the session where M stands for May. Abbreviations *w'*, *res.*, and *care.* stand for with, resident, and caregiver respectively.

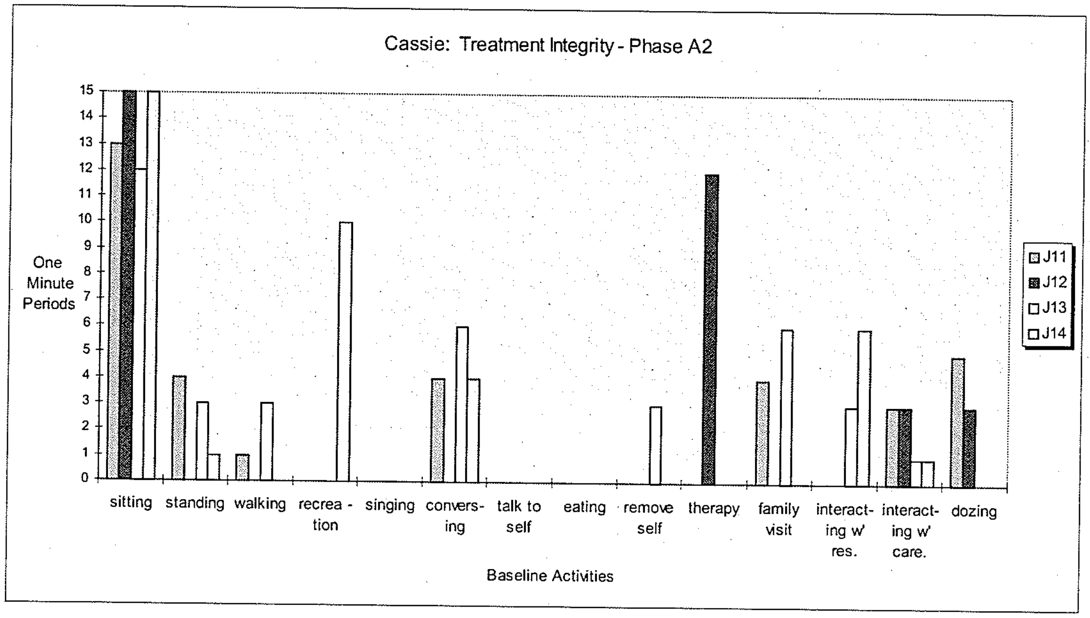


Figure 4.7. The number of one-minute periods of Cassie's involvement in each measured baseline activity for every session of phase A2. Each color of bar corresponds to the date of the session where J stands for June. Abbreviations *w'*, *res.*, and *care.* stand for with, resident, and caregiver respectively.

the first individualized DMT session for Cassie or may have related to the "new and temporary" research assistant for that day (from log book entries). The session on J8 as reported in Chapter 3—Methods (see page 182), did not involve any dance movement therapy and was essentially a conversation between Cassie and the dance movement therapist. Taking session J8 out of the visual analysis showed that there was no overlap of the Overall, Action, or Arousal data points from phase B through phase A2 and phase B2. Almost all overlap occurred due to higher responses during phase A.

A brief analysis of the Action and Arousal scores illuminated the overlaps seen in the Overall scores. Three of the five overlaps in phase A occurred in the Action scores. Figure 3.2, that details Cassie's PRS mean scores, shows that for all categories of the Action score, except *Looks at carer*, Cassie scored higher in the first baseline phase (A) than in the second baseline phase (A2).

Logbook analysis showed that Cassie was frequently bothered by the presence of the observers. This response was most acute during the beginning of the project (phase A) and became less disruptive during phase A2. The higher Action scores may reflect Cassie's efforts during the first baseline phase to make her displeasure of being observed known to those around her. Additional to this argument is the point that Cassie's score for *Initiates interaction* was higher for phase A than for phase A2 (see Figure 3.2). Despite the inconsistencies in phase A, the general non-overlapping of Overall data points in phases A2, B, and B2 strengthened the argument for a positive intervention effect as seen in the analysis of mean, level, and latency of Cassie's Overall scores. This intervention effect was repeated across both the initial and subsequent set of baseline and intervention phases.

Sub-Component scores. The mean Action scores for each phase were: A—64; B—80; A2—53; B2—77. The mean Arousal scores for each phase were: A—16; B—22; A2—15; B2—27. For the most part, the Action and Arousal scores followed the Overall scores. Therefore the same data pattern existed for these sub-components as for the Overall score. The visual analysis of the Action and Arousal scores for Cassie showed a similar pattern in mean, level, trend, latency, and overlapping data points as was seen for the Overall score.

However Figure 4.5, the graphical display of Cassie's PRS scores, shows that there is one data point of the Arousal scores where the change in the level of the data, and the latency of this change are unclear. The Arousal score for the J8 session (as mentioned above) created a problem for a clear effect; although this session was not representative of the DMT program. A change in level and a lack of latency from the end of each phase to the beginning of the next phase was in every other instance visually clear.

A more detailed analysis of the sub-components was done using Figure 3.2, which shows Cassie's mean points for each category in the PRS for each phase. This analysis showed that the change from baseline to intervention of the Action scores could be accounted for by consistent change in all the Action categories, *Deliberate body movement* (DBM), *Deliberate head movement* (DHM), *Vocalization* (VOC), *Looks at environment* (LE), and *Looks at carer* (LC). Although for Cassie, as for Bev, the categories LE and LC were found to be somewhat exclusive categories, showing an opposing direction of change from phase to phase, the increase in LC was far greater for the intervention phases than the increase in LE was for the baseline phases (see Figure 3.2).

Similar to the Action Scores, most of the change from baseline to intervention of the Arousal scores could be accounted for by change in the sub-component categories. The categories *Engagement* (ENG) and *Happy* (HAP) each show a consistent increase with the introduction of the intervention and a decrease upon a return to baseline activity. The category *Initiates interaction* (II) deviates from this pattern with higher PRS points during phase A than in phase B, but continues the overall pattern from phase B through phase A2 and phase B2. This deviation of pattern in phase A has been addressed with the report of overlapping data points in the section on Cassie's Overall scores. The unexpected higher points in that category (II) were accounted for by Cassie's early discomfort with the presence of the observers and her clear engagement in making this known to other persons in her environment (logbook entries).

Notable in this general pattern of decrease at baseline phase and increase with intervention phase was the clear change in PRS points for Cassie within the category of HAP (see Figure 3.2). Excepting the deviation for the II category, all changes in the PRS categories of Cassie's points (and therefore in the sub-components Action and Arousal) occurred for both the initial and subsequent sets of phases. This analysis of the details of sub-component categories strengthened the determination of an intervention effect upon Cassie's responses as seen in Figure 4.5, Cassie's PRS scores.

Rhonda

Overall score. Despite the variability of Rhonda's scores a change in mean of the Overall score is visible in Figure 4.8 of Rhonda's PRS scores. Rhonda's mean Overall scores for each phase were: A—46; B—52; A2—40; B2—53. Although the changes in mean were not as significant as those seen with Bev or Cassie, the pattern of increase in the mean Overall score with the introduction of the intervention, subsequent decrease at the return to baseline, and increase with reintroduction of intervention remains visible in Figure 4.8. The shifts from phases B to A2 to B2 were also accompanied by a change in level of the data. These changes in level follow the direction of the changes in mean thereby strengthening the determination of a possible intervention effect. Such a change in level was not visible at the shift from phase A to phase B. This was somewhat accounted for by the variability of the data in phase A.

The change in Rhonda's Overall score from phase A to phase B also showed some latency of effect which was not visible in shifts from phases B to

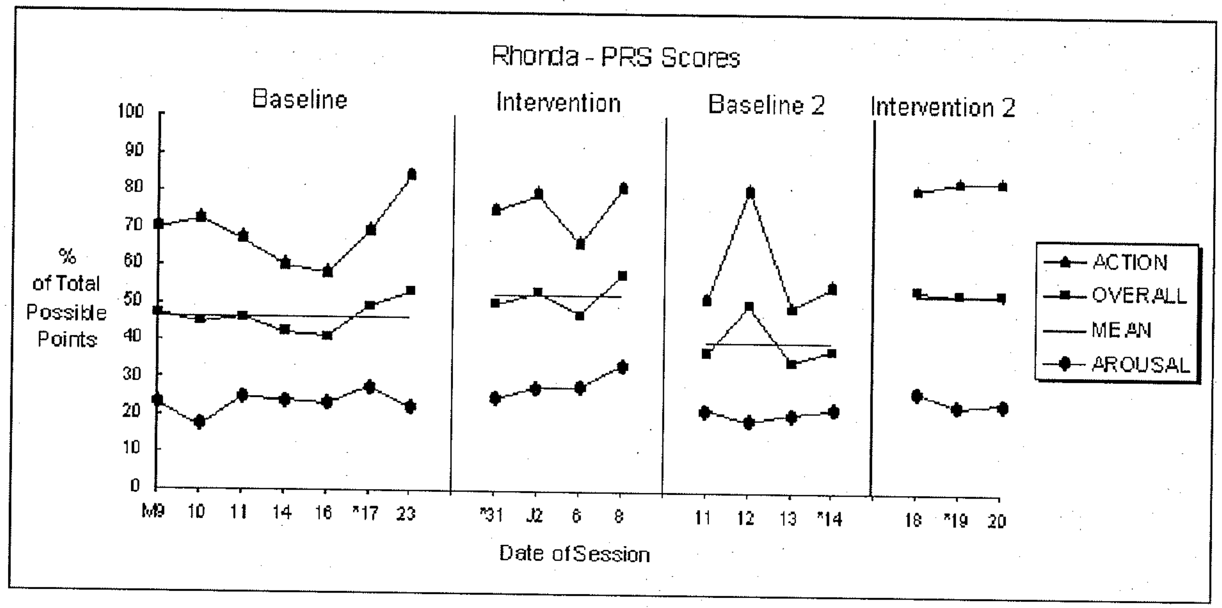


Figure 4.8. Rhonda's Positive Response Schedule scores for each session of the two baseline and two intervention phases. Dates marked with * were afternoon sessions; all unmarked dates were morning sessions

A2 to B2. Additionally there were three overlapping data points between phases A and B. The sessions of overlapping points are M17, M23 and J6.

Analysis of treatment integrity data revealed useful information regarding the M17 and M23 sessions in phase A. Figure 4.9 shows Rhonda's overall participation in recreation activities for phase A, while Figure 4.10 shows her participation for phase A2. Although Rhonda's recreation participation during sessions M17 and M23 do not stand out as unusual for phase A (or phase A2) further analysis showed that Rhonda spent an unusual amount of Daily Activity time during sessions M17and M23 in organized recreation.

Figure 4.11 shows the relationship of Rhonda's amount of participation in organized recreation activities during phase A to her Overall score for each session in phase A. The Overall score represents the percentage of the total possible PRS points (300) for each session. The amount of participation in organized recreation is shown as a percentage of the total time of recreation participation for each session. The maximum time measured within each session was 15 minutes.

Visual analysis of this graph showed that sessions M17 and M23 stood out as having had much higher percentages of recreation time spent in organized recreation activities than during other sessions in phase A. The treatment integrity checklists for M17 and M23 showed that the organized recreation at session M17 was all out-of-doors (the only such session during the

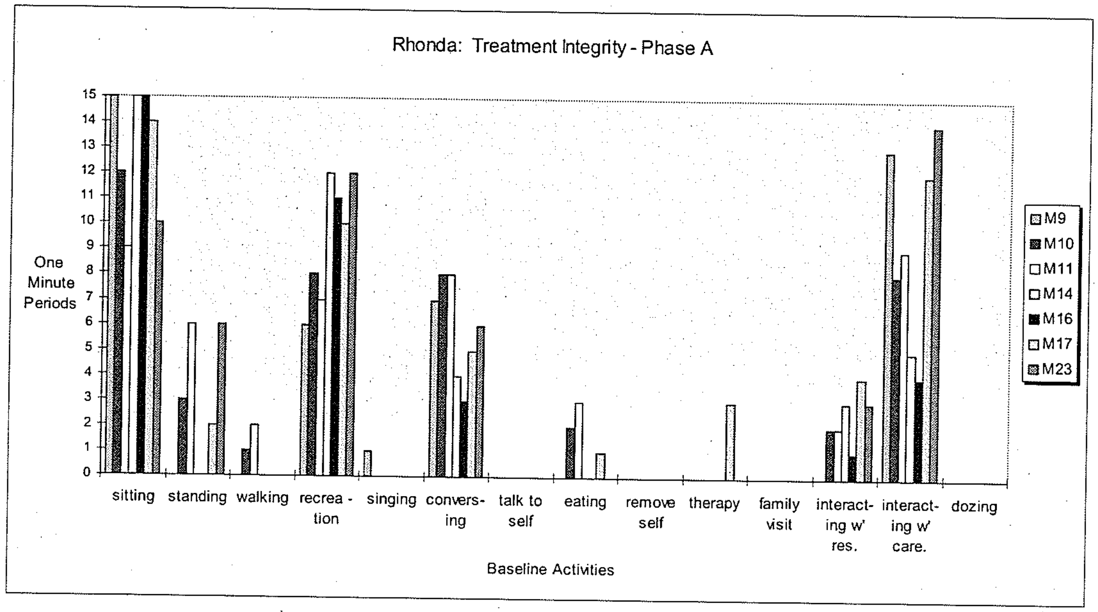


Figure 4.9. The number of one-minute periods of Rhonda 's involvement in each measured baseline activity for every session of phase A. Each color of bar corresponds to the date of the session where M stands for May. Abbreviations *w'*, *res.*, and *care.* stand for with, resident, and caregiver respectively.

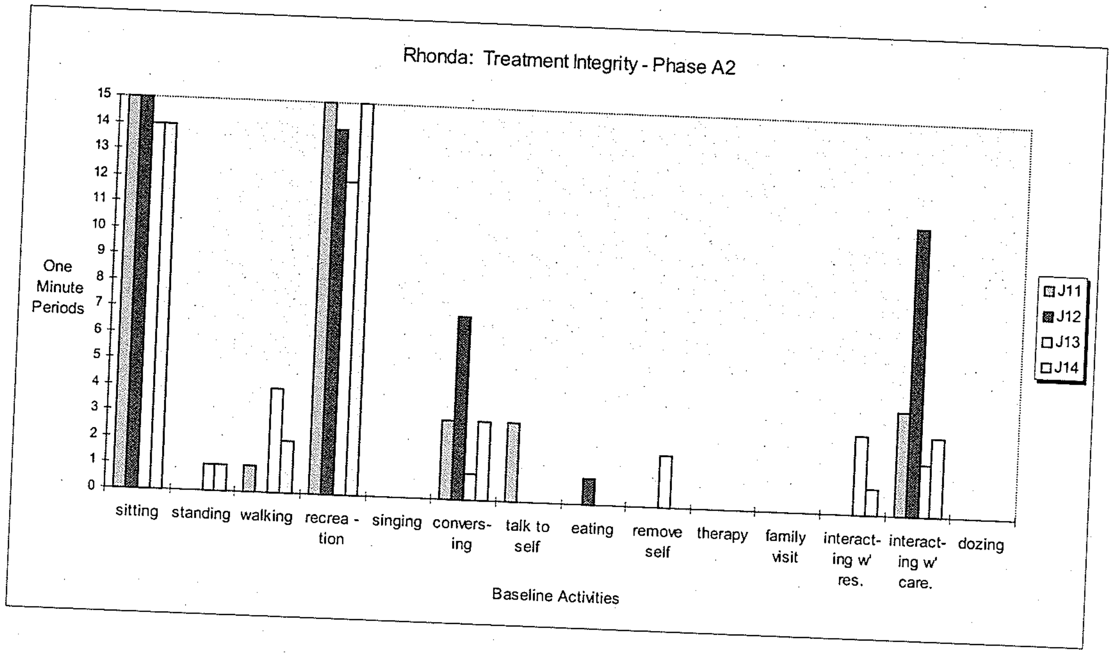


Figure 4.10. The number of one-minute periods of Rhonda 's involvement in each measured baseline activity for every session of phase A2. Each color of bar corresponds to the date of the session where J stands for June. Abbreviations *w'*, *res.*, and *care.* stand for with, resident, and caregiver respectively.

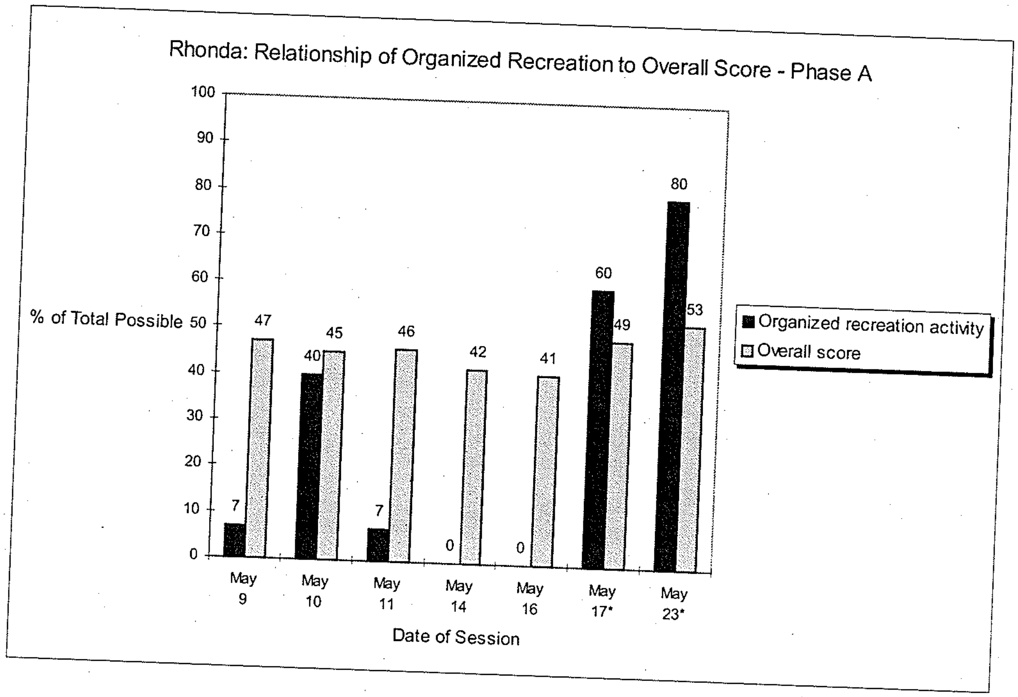


Figure 4.11. Relationship of Rhonda's organized recreation activity to Rhonda's Positive Response Schedule scores for each session of baseline phase A: Dates marked with * are sessions which have overlapping data points with phase B.

project); and that session M23 consisted of a variety of activities. These four activities were:

1. Step-Dancing to a recorded tape with a volunteer assistant.
2. Dyna-Band stretching with a volunteer assistant.
3. A tea party for a group of residents, which was gathered together by a volunteer assistant.
4. Hanging decorations with the recreation specialist.

Session J6 (phase B) also had an Overall score data point overlap with phase A. Analysis of the log book revealed that there were two problems at the session with Rhonda on that day. Most importantly was a problem with the scoring of Rhonda's session whereby the research assistants had not finished two sections of the PRS when the session was completed. Therefore Rhonda was recorded as scoring zero (nonoccurrence) for six minutes of the15 minutes of time measured. The second problem was Rhonda's unwillingness to take part in a full session on that day. The logbook entry states that:

> "Rhonda was waiting for a phone call.... It took some convincing to get her to leave her room. Once in the session she reminded me frequently that she was waiting on a call so to make it short! She did not put her usual effort into the dance" (June 6, 2001).

The only Overall score data point overlap between phases A2 and B2 was at session J12. This session was discussed in Chapter 3—Methods regarding the variability of Rhonda's data (see page 179). The spike in the Overall score on this session was, like sessions M17 and M23, accounted for by a large increase in time spent by Rhonda in organized recreation activity.

There did not appear to be any definite trend or slope of the data for any phase of Rhonda's Overall scores. This, in addition to the lack of latency in the last three phases suggested that there was a change in the rate of Rhonda's response from intervention to baseline and return to intervention. The change in level and mean between these phases (B, A2, and B2) suggested a change in the magnitude of Rhonda's response. These decisive changes in rate and magnitude of Rhonda's response did not occur with the shift from the first baseline phase to first intervention phase; although there was some change in mean.

Sub-Component scores. The mean Action scores for Rhonda, for each phase were: A—69; B—75; A2—59; B2—82. Unlike Rhonda's Overall scores her Action scores showed a definite change in mean and level for each phase (also see Figure 4.8). Unfortunately due to the variability of the Action scores in phase A there is a visible decrease of level, rather than an increase, at the shift to phase B. These Action scores showed no definite trend within any phase, or latency at the shift between phases. Similar to Rhonda's Overall scores the overlapping data points for Rhonda's Action scores were sessions M23 in phase

A, J6 in phase B, and J12 in phase A2. Each of these sessions has been mentioned previously with regard to variability of data and treatment integrity.

Taking into account the explanation for the spike at session J12, the pattern of change of mean, and level, with no trend or latency between baseline and intervention phases seemed to be visibly clear for the Action sub-component in phase B to A2 to B2.

Figure 3.3 of Rhonda's mean Positive Response Schedule points for observation categories, shows that most of the change visible in the sub-component Action occurred within the PRS categories *Vocalization* (VOC), *Looks at environment* (LE), and *Looks at carer* (LC). The categories *Deliberate body_movement* and *Deliberate head movement* did not show an increase with the introduction of the intervention until the last phase (B2). Again there was the familiar pattern of negative relationship between change in the categories LE and LC. The large changes in the LC category, and the large increase in the VOC category for Rhonda's scores were notable.

The mean Arousal scores for Rhonda for each phase were: A—23; B—29; A2—21; B2—25. Rhonda's Arousal scores followed the changes in her Overall scores; where there was no visible change in level and some latency of change between phase A and B; although there was some change of mean between all phases. Between phases B, A2, and B2 Rhonda's Arousal scores showed clear change in level without any latency of change from intervention to baseline to intervention. Trend was not visible in any of Rhonda's Arousal scores. There were no overlapping Arousal data points between phases B and A2; or between A2 and B2. Overlapping Arousal data points occurred in five of the seven points in phase A. These points overlapped with one point in phase B, and one point in phase B2.

Despite a change in mean, a clear determination of change from phase A to phase B was not possible due to the large number of overlapping data points, the lack of positive change in level, and latency of change with the introduction of the intervention with phase B. Therefore the analysis of mean, level, trend, latency, and overlap of Rhonda's Arousal scores showed that only in the last three phases (B, A2, B2) was there displayed change in the magnitude and rate of Rhonda's responses as measured by the sub-component Arousal.

Regarding the PRS categories for this sub-component Arousal, Figure 3.3 shows that Rhonda scored quite high in the category *Engagement* (ENG) for all phases, with small differences between baseline and intervention phases. The clearest pattern of an intervention effect in the sub-component Arousal was visible with the categories *Initiates interaction* and *Happy* (HAP). The low score for HAP in phase B2 in notable in Figure 3.3; however it was still higher than the score for phase A2 (which was .25 of a percentage point).

Analysis of Rhonda's Overall score suggested a possible intervention effect, while the analysis of the Action and Arousal scores showed some inconsistency of strength of an intervention effect. The Action scores demonstrated more clearly an effect than the Arousal scores showed. Table 4.2, of comments regarding Rhonda taken from the logbook, reveal inconsistencies in Rhonda's interest in the DMT. These inconsistencies were considered to be reflective of Rhonda's commitment to the exercise part of the DMT, but lack of emotional and intellectual engagement. Evidence for this determination was drawn from the logbook (see Table 4.2).

Patrick

Overall score. Patrick's mean Overall scores for each phase were: A—50; B—52; A2—50; B2—55. Figure 4.12 of Patrick's PRS scores showed no discernible change in the mean of the Overall scores until phase B2. The change in mean from phase A2 to phase B2 was only five percentage points. This small change in mean was similar to the change in Rhonda's Overall scores from phase A to B (six percentage points). Patrick's Overall scores showed some minor change in level from phase B to A2 and from phase A2 to B2. This analysis of mean and level suggested that overall there was little or no change based on the intervention.

Figure 4.12 shows only phase B to have some increasing trend of data. Within phase B session J6 was slightly outside of this slight trend; being somewhat below the slope. An analysis of the logbook revealed a possible explanation. Often Patrick's chronic lung disorder made it difficult for him to

Table 4.2. *Comments Regarding Rhonda Taken from Research Logbook*

Videotaping Session.

A11	"It was hard to say whether Rhonda would stay. She decided this was not for her. 'This isn't what I thought it would be' (Rhonda, April 11, 2001). I assured her if she stayed to at least listen to the music she could leave if she didn't like it. She agreed.... Rhonda watched the upper body movement. When we began legs and feet she jumped in and continued to participate."
Phase A	
M16	"Rhonda says she is more comfortable in her room."
Phase B	
M31	"Rhonda was positive and engaged. She couldn't believe the others were leaving. 'We get precious little exercise in this place' (Rhonda, May 31, 2001). This session turned out to be an individual session for Rhonda as the other participants left.
J2	"Rhonda is not fully enjoying herself--she says 'it is O.K.'--she may need some higher level cognitive associations to enjoy this (DMT) better--she is committed to engaging because of the value of exercise.
J6	"It took some convincing to get her (Rhonda) to leave her room. Once in the session she reminded me frequently that she was waiting on a call so to make it short!"
J7	"Rhonda decided that one class a week was plenty for her so she would not be joining us today! I could not convince her otherwise; although I do not try too hard because I do not want to remove her freedom of choice nor her feeling of control over her living environment." No session this day.
J8	"These comments she makes (Rhonda) although accurate serve to condemn (other participant) who she does not care for."

Table 4.2. *Comments Regarding Rhonda Taken from Research Logbook* continued

Phase B2	
J18	Rhonda "...participated in her usual restrained and controlled manner. I tried to use verbal guidance and interaction with her to help engage her mind more."
J19	"Rhonda was her usual helpful self today but had been sleeping and said I should make it short as she was still tired."
J20	"Rhonda was eager to participate today (morning?). She talked actively throughout. She took initiative in creating dance movements suitable to her abilities as she sees them (impt. to her).

breathe. This was the situation on the J6 session. "Patrick has great difficulty breathing so he needs some adaptation to seated movement" (June 6, 2001). Despite Patrick's difficulty with physical exertion the logbook also relates; "Patrick hugged me (dance movement therapist) after the session". Notable in this analysis is that for the session J6, although Patrick's Overall and Action scores decreased, his Arousal score increased.

Despite the subtle trend in phase B there was little change in mean across phases A, B, and A2. This trend in phase B was associated with some latency of change in the data; as there was not a clear increase in Overall score at the shift of phase with the introduction of the intervention at session J2. Considering the small change in mean with phase B2 this trend with latency in phase B was suggestive of a gradual receptivity by Patrick to the intervention; but without a clear response showing strength of effect.

Only phases A2 and B2 were without overlapping Overall data points between them. Clearly there were numerous overlapping Overall data points between the other phases (A to B, and B to A2); and no single pattern of intervention effect from phase to phase.

Sub-Component scores. The mean Action scores for Patrick for each phase were: A—79; B—80; A2—81; B2—88. The mean Arousal scores for Patrick for each phase were: A—21; B—24; A2—20; B2—22. Patrick's Action scores followed his Overall scores fairly closely; with a clear change in mean

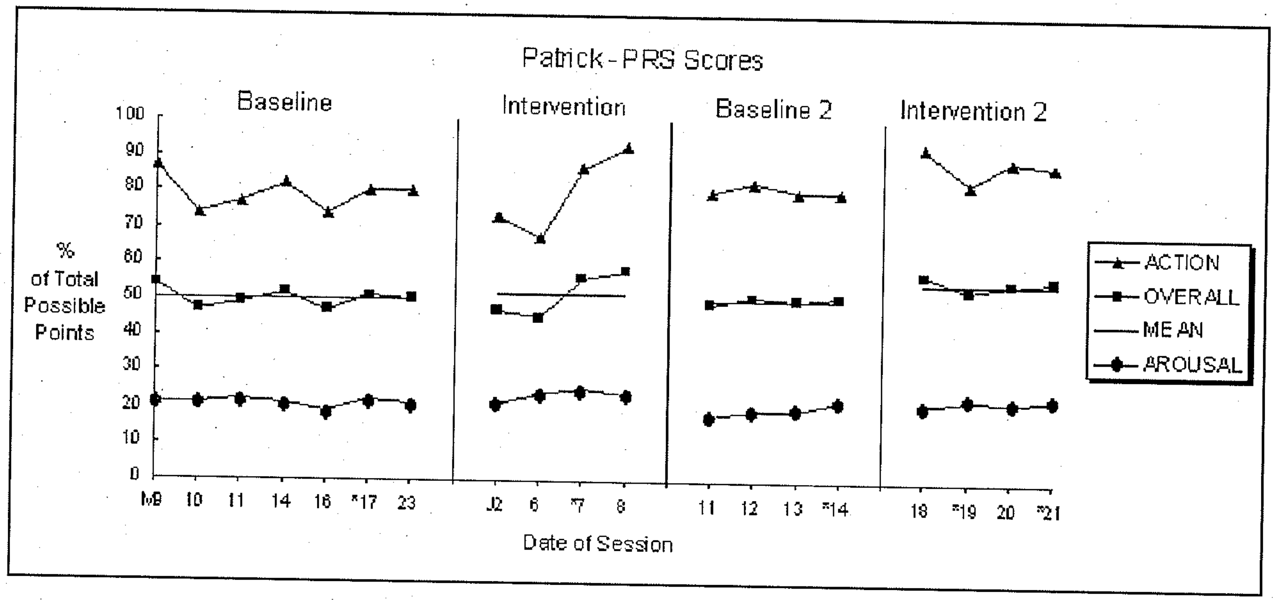


Figure 4.12. Patrick's Positive Response Schedule scores for each session of the two baseline and two intervention phases. Dates marked with * were afternoon sessions; all unmarked dates were morning sessions.

and level for only the shift from phase A2 to B2. However, an analysis of Patrick's mean Positive Response Schedule points for observation categories (see Figure 3.5) illuminated areas of change across phases. This analysis revealed that much of the effect of the intervention was lost within certain categories; such as a saturation of the *Deliberate body movement* (DBM) and *Deliberate head movement* (DHM) categories. Generally, any change in the sub-component action came from the *Looks at environment* (LE) and *Looks at carer* (LC) categories. Again these categories showed a pattern of mutual exclusiveness; with an opposing direction of change from phase to phase. Figure 3.5 shows also that the increase in LC was far greater for the intervention phases than the increase in LE was for the baseline phases.

The category *Vocalization* (VOC) was nearly saturated for phases A, A2, and B2. During phase B Patrick hummed considerably less. Given the increase in humming during phase B2, the DMT program was probably not the reason for the diminished humming in phase B. Rather the pressure but on Patrick (to cease humming; see Chapter 3—Methods, page 191) at the onset of the attempted group DMT session (May 31) could have accounted for this outcome. With near saturation in three of the five categories of the Action score it was not surprising that little effect was visible in the PRS graphical display for Patrick (see Figure 4.12).

Patrick's Arousal scores were very stable throughout the project, staying within a narrow range of the possible Arousal score (see Figure 3.5 showing the percentage of possible range of scores for each participant). This resulted in very little change in mean and level from phase to phase (see Figure 4.12). Along with no real magnitude of change in Patrick's Arousal scores there was also no rate of change in these scores from phase to phase. Patrick's Arousal scores occurred within a much smaller range than the Arousal scores of the other participants (see Figure 3.4). Despite this limitation of Arousal response by Patrick, some small changes of Patrick's Arousal scores are visible in Figure 3.5 of Patrick's mean Positive Response Schedule points for observation categories.

Generally these changes were lost in the graphical display (Figure 4.12) due to the large responses by Patrick in the category *Engagement* (ENG) and small responses in the categories *Initiates interaction* (II) and *Happy* (HAP). However the categories II and HAP did show increases with the introduction of the intervention at phases B and B2. The large and stable score of ENG was, like the DBM, DHM, and VOC categories, either a direct result of, or indirectly related to Patrick's almost constant humming (see Chapter 3—Methods, page 188). Clearly in Figure 3.5 the reduction of Patrick's VOC score in phase B coincides with a lower score in the LE category and higher scores in the categories II and HAP, over those in phase B2. Since humming qualified as an activity Patrick scored high for the category ENG during both baseline phases Patrick also scored high during the intervention phases for his engagement in the DMT.

The overall pattern of Patrick's PRS scores (see Figure 4.12) is one of inconsistencies. The shift from phase A to B had a mean Action increase of one percentage point while the mean Arousal increase for that shift was three percentage points. The shift from phase A2 to B2 had a mean Action increase of seven percentage points while the mean Arousal increase for that shift was two percentage points. Without controlling for the influence of Patrick's humming and related head and body movement it was impossible to evaluate the differential influence of the DMT.

Graphs of treatment integrity measures for Patrick (Figures 4.13 and 4.14) show that during baseline phases (A and A2) Patrick spent nearly all of his time seated. Therefore the DBM and DHM categories were not sensitive to any real change in Patrick body movement. Additionally the VOC and ENG categories were not sensitive to differences between DMT responses and Patrick's humming. Humming was scored as engagement and vocalization, which in most cases included deliberate head and body movement. Patrick's generally low Arousal score was a notable result; particularly with regard to the intervention phase increases in the categories II and HAP.

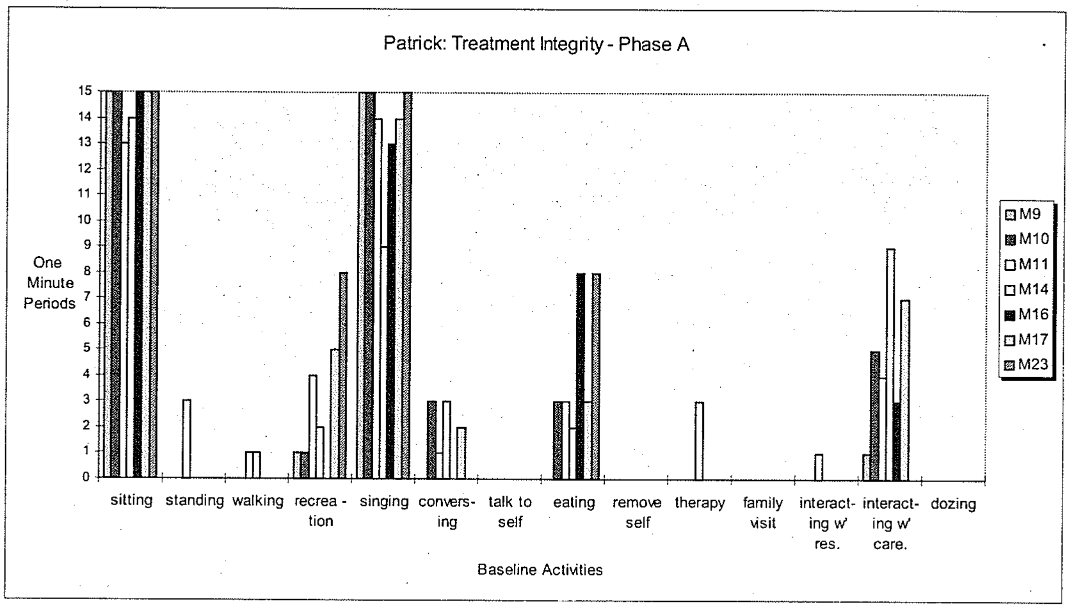


Figure 4.13. The number of one-minute periods of Patrick 's involvement in each measured baseline activity for every session of phase A. Each color of bar corresponds to the date of the session where M stands for May. Abbreviations *w'*, *res.*, and *care.* stand for with, resident, and caregiver respectively.

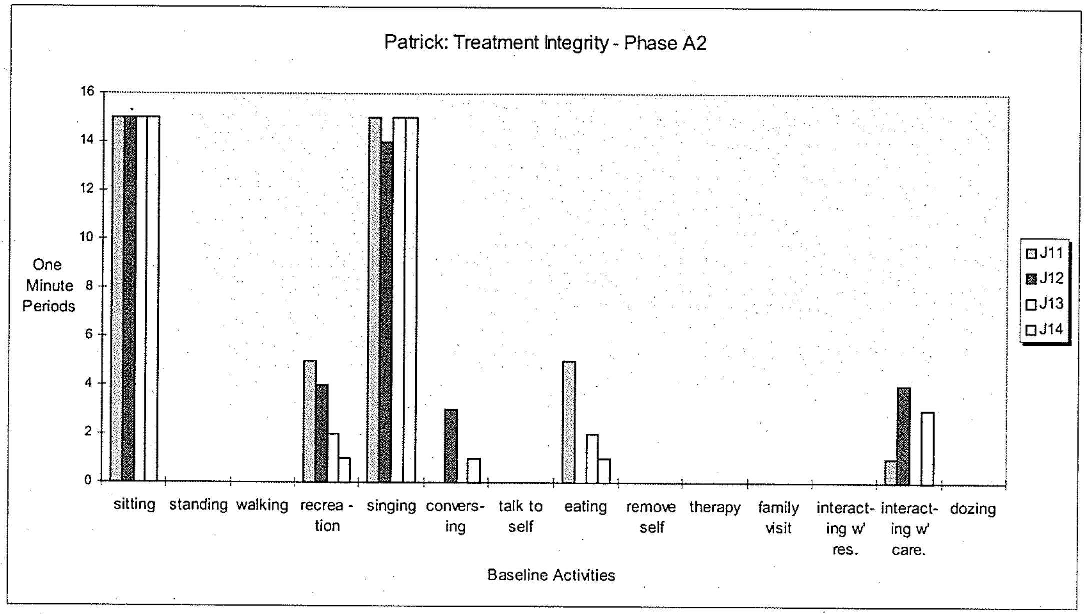


Figure 4.14. The number of one-minute periods of Patrick 's involvement in each measured baseline activity for every session of phase A. Each color of bar corresponds to the date of the session where J stands for June. Abbreviations *w'*, *res.*, and *care.* stand for with, resident, and caregiver respectively.

Intersystem Analysis

Direct intersystem replication is used in SSM as a method of validating the findings across persons who are expected to differ somewhat. Dattilo and associates (1993) suggest that this type of replication is accomplished by including at least three subjects in a SSM study. When the findings concur across the three study participants these findings are considered to be further established; therefore externally valid and can be generalized to the population that the participants represent. The results of the intersystem analysis for this study are presented with regard to the Overall scores of the participants and then with regard to their sub-component scores.

Overall Score

Overall score data for two of the participants (Bev and Cassie) showed clear changes in mean and level at each change of phase (A to A2 to B to B2). Additionally the data for Bev and Cassie showed no trend (except some possible trend in phases A and B for Cassie). The data for both Bev and Cassie showed no latency of effect for all phases. All overlapping data points found in Bev and Cassie's graphs were amiable to treatment integrity and logbook explanations. This pattern of change from baseline to intervention with return to baseline scores and subsequent return to intervention scores with the reintroduction of the intervention was consistent for both Bev and Cassie.

This baseline to intervention pattern was found to occur for the Overall scores of Rhonda; but only for phases B, A2 and B2. Rhonda's Overall scores for these phases (A2 and B2) support as well the findings for Bev and Cassie; regarding changes in mean and level with no trend or latency of effect. All overlapping data points in Rhonda's Overall scores were similarly accounted for. Despite the lack of a phase A to phase B2 pattern the analysis supported the argument that Rhonda's scores replicated those of Bev and Cassie. However Rhonda's scores did not show as strong a magnitude of effect as those of Bev and Cassie; and cannot be considered as direct intersystem replication of the results.

The Overall scores of Patrick did not support the findings of intrasystem analyses for Bev, Cassie, and Rhonda. Although Patrick's scores showed a small change in mean and level, without trend or latency, from phase A2 to B2 the change is small and was not produced in the preceding phases

The above analysis supports the finding of an increase in magnitude and rate of response by Bev and Cassie with the introduction of the intervention, a decrease of magnitude and rate of response by Bev and Cassie with the return to baseline activities and a subsequent increase of magnitude and rate of response with the reintroduction of the intervention.

Sub-Component Scores

Generally the pattern of visual criteria seen in the scores for the sub-components, Action and Arousal followed those of the participant's Overall score (for Bev, Cassie, and Rhonda). Not very surprising the categories *Looks at environment* (LE) and *Looks at carer* (LC) were nearly mutually exclusive. The nature of the one-on-one DMT program in comparison to the broader range of general daily activities on the special care unit likely contributed to this finding; which was consistent across all participants (Bev, Cassie, Rhonda, and Patrick). Additionally, for all four participants, increases in LC for the intervention phases were greater than the increases in LE were for the baseline phases.

With the introduction and withdrawal of the intervention, scores in the other Action categories were more variable across participants. The scores for Bev, Rhonda and Patrick showed little change in the categories *Deliberate body movement* (DBM) and *Deliberate head movement* (DHM), while those for Cassie showed clear increase with the introduction of the intervention and decrease at baseline. The scores for Bev, Cassie, and Rhonda showed increases for the category *Vocalization* (VOC), which was not seen in the scores for Patrick.

A similar analysis of the Arousal scores showed that a clear effect could be seen for all participants in the categories *Initiates interaction* (II) and *Happy* (HAP), although for Cassie the effect in II was not present for phase B (as previously described). The category *Engagement* (ENG) involved inconsistent results with a clear increase of score being seen for Bev and Cassie; a similar but very small intervention effect for Rhonda; and a decrease of score for Patrick. However these results are consistent with the PRS scoring protocol for engagement; whereby Patrick's time humming and Rhonda's ability to engage in self-directed activities are all considered engagement.

This analysis of the sub-components, Action and Arousal, illuminated the importance of the categories LE, LC, II, and HAP in determining the nature of the intervention effect. Since the categories VOC and ENG were of variable influence these influences should be considered with caution. The categories DBM and DHM proved to be subject to differences of participants' undirected physical activity.

Social Validity

Two types of questionnaires were used to conduct a survey of the social validity of the dance movement therapy program. The results of the questionnaire for the DMT participants is provided first, followed by the results from the questionnaire for concerned persons.

Participant Questionnaire

Three of the four participants were able to answer the questions from the survey. Bev and Rhonda were unavailable immediately after their last DMT session to answer questions. Rhonda was able to answer the questionnaire five days after her last session. Four days after her last session Bev was unable to remember what the "dancing" was about. Both Cassie and Patrick answered the questionnaire immediately after their last session.

The questions were presented verbally to each participant. The questions were:

1. Did you enjoy this dance movement time with me?
2. What did you enjoy (or not enjoy) about doing this dancing?
3. Can you tell me why you did (or did not) enjoy this time you spent dancing?
4. Would you like to do the dancing again in the future?

All three participants (Cassie, Rhonda, and Patrick) who answered the questionnaire said that they enjoyed their dance movement time. When asked what they enjoyed or did not enjoy about the dancing Rhonda and Cassie referred to the physical activity aspect of the sessions. "I think just the activity is the best way to put it" (Rhonda, June 25, 2001). "Moving around which I don't do much" (Cassie, June21, 2001). Patrick's answer was a bit more cryptic, "Because I was separating the dance I get a chance to see it" (Patrick, June 21, 2001). However mysterious, Patrick's statement expresses "doing, activity and opportunity".

When asked why they had enjoyed the dancing both Rhonda and Cassie again referred to the physical activity. "Well it sort of keeps you on the go a little"

(Cassie, June 21, 2001). “As you can see we spent a lot of time sitting around here. When you are use to being active anything that does that is a plus” (Rhonda, June 25, 2001). Again Patrick differed in his response, citing a more cerebral reason; “It had been on my mind for so many years” (Patrick, June 21, 2001).

Each of the three participants questioned was asked if they would do the dancing again. All three said they would. Cassie said “Again? Oh yes I think so—if I don’t fall down” (June 21, 2001) and when asked for additional comments she added “Just that I enjoyed it” (Cassie, June 21, 2001).

Concerned Persons Questionnaire

Seven persons answered the questionnaire. Six of these seven were health centre direct caregivers and one was a health centre administrative support. All seven persons had known the participants for less than two years with one person having known the participants for less than six months. None of the seven people had known any of the participants before they became residents at the health centre. Two of the seven persons made additional comments on the questionnaire.

The results of the questionnaire are displayed as bar graphs in Figures 4.15, 4.16, and 4.17 regarding the program goals, procedures and outcomes respectively. Each area was assessed with statements that followed a description of the program goal, program procedures and excepted program outcome. Respondents expressed their opinions regarding each statement by choosing on a five responses offered on a Likert scale. These responses were Strongly Agree (5), Agree (4), Undecided (3), Disagree (2), and Strongly Disagree (1).

Program Goals

The area of program goals assessed the importance and acceptability of the DMT program goals through four statements (see Figure 4.15). The description of program goal stated:

> *The primary goal during the 'dance movement program for persons with Alzheimer type dementia' is for the participant to experience and express an increase in physical activity and emotional expression.*

The first two statements assessed the acceptability of the program goals as outlined on the questionnaire.

Statement 1: I think this goal reflects the needs of the person I know.

Statement 2: I think this goal is reasonable to achieve.

The second two questions assessed the importance of this goal.

Statement 3: I think this goal is worthy of the time and effort necessary to achieve it.

Statement 4: I think this goal would be an important achievement for the person I know.

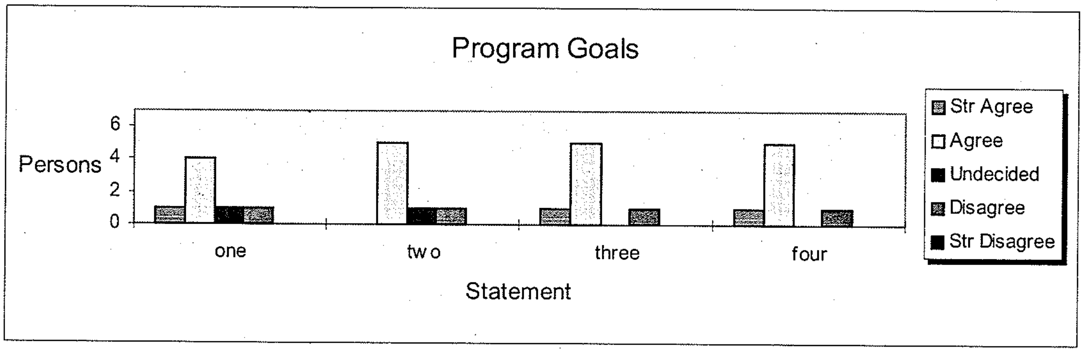


Figure 4.15. The results of seven concerned persons' responses to four statements regarding the acceptability and importance of the DMT program goals.

Statement 1: I think this goal reflects the needs of the person I know.

Statement 2: I think this goal is reasonable to achieve.

The second two questions assessed the importance of this goal.

Statement 3: I think this goal is worthy of the time and effort necessary to achieve it.

Statement 4: I think this goal would be an important achievement for the person I know.

These four statements, regarding the importance and acceptability of the DMT program goals as outlined in the questionnaire, were found to be agreeable to most of the respondents. This can be seen in Figure 4.15. One of the additional comments made by a respondent on a questionnaire addressed the importance and acceptability of the program goals. “With commitment from all staff and team members, this program provides an excellent opportunity for residents, and fills out therapeutic activities on the Special Needs Unit!” (Anonymous, 2001).

Program Procedures

Figure 4.16 shows the results of the assessment of the program procedures. Program procedures were assessed according to acceptability of those procedures. A description of the DMT sessions preceded the two statements of opinion. The description of program procedures stated:

The dance movement session consists of both seated and standing movement to music. Each session includes: introductions and greetings; a warm-up section with guided breathing and head to foot seated movement; standing whole body movement such as swinging, twisting, and reaching; partnered stepping and turning in space; and interactive movement, including a creative expression section. The session ends with gentle calming movements, discussion, and farewells. Although group sessions are possible this program involved one person with dementia and one dance movement therapist at each session.

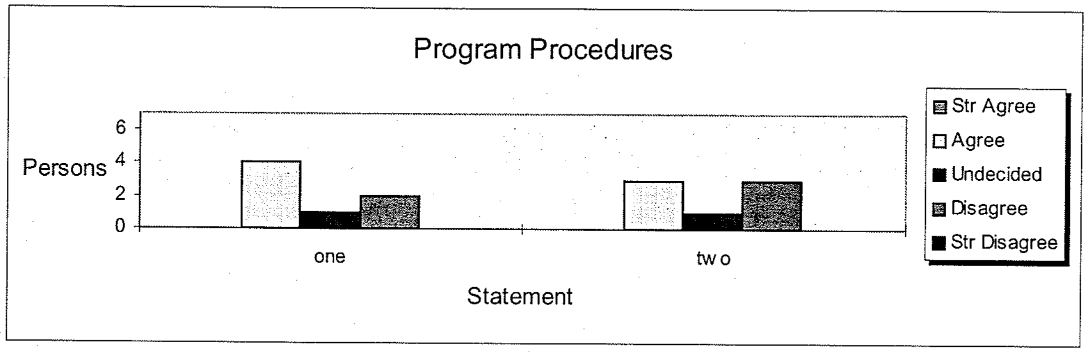


Figure 4.16. The results of seven concerned persons' responses to two statements regarding the acceptability of the DMT program procedures.

Statement 1: I think this dance movement activity is appropriate for the person I know.

Statement 2: I think this dance movement activity could be provided easily on any special care unit.

Statement 1: I think this dance movement activity is appropriate for the person I know.

Statement 2: I think this dance movement activity could be provided easily on any special care unit.

Figure 4.16 shows that although most of the respondents thought that the DMT program procedures were acceptable for the persons with DAT, they were divided as to the acceptability of providing such a program on the SCU.

Program Outcomes

Program outcomes were assessed according to the importance of these outcomes. A description of the expected outcome of the DMT program stated:

> *The dance movement program is designed to enhance positive activity and emotional response so as to reveal and extend other retained abilities of the person with Alzheimer type dementia.*

Two statements followed this:

Statement 1: I think the outcome explained above is worthy of the time and effort of the staff at the healthcare centre.

Statement 2: I think the outcome explained above is worthy of the time and effort of the person I know.

The results of these statements regarding program outcomes are displayed in Figure 4.17. These results show that the respondents considered the anticipated DMT program outcomes important.

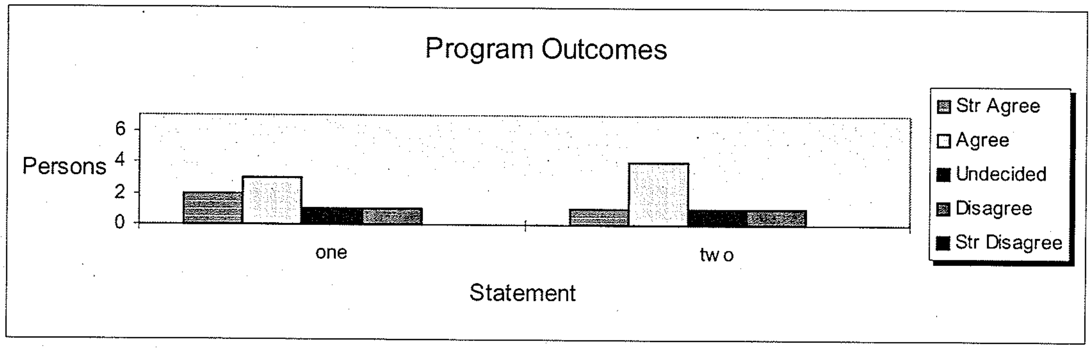


Figure 4.17. The results of seven concerned persons' responses, to the two statements regarding the importance of the DMT program.

Statement 1: I think the outcome explained above is worthy of the time and effort of the staff at the healthcare centre.

Statement 2: I think the outcome explained above is worthy of the time and effort of the person I know.

Social Validity Analysis

These results may reflect the small and somewhat homogeneous sample of concerned persons. Despite the overall positive assessment of social validity, the results must be tempered by the small but consistent disagreement with all program goals, procedures and outcomes that can be seen in the bar graphs (see Figures 4.15, 4.16, 4.17). Six of the seven concerned person respondents were health centre direct caregivers. The seventh respondent was a health centre administrative support. Figure 4.18, showing the strength of all respondents' opinions on the questionnaire, reveals that the majority of responses were in the category *Agree*, for both direct caregivers (52%) and the one administrative support person (100%). Only 23% of all responses were in the category *Disagree*, while there were no responses in the category *Strongly Disagree.* The categories *Strongly Agree* and *Undecided* were each chosen for 12.5% of possible responses. One respondent accounted for 73% of the responses in the category *Disagree*. This respondent did not offer additional comments. Another respondent did offer this comment, "Some participants more cognitively intact thought this process was silly—some with cognitive impairment were agitated by being observed—there was some disruption on the unit due to the frequent entrances and departures of the research team" (Anonymous, 2001). Although this person thought the goals of the program were acceptable in reflecting the resident's needs, and important enough to spend time and effort

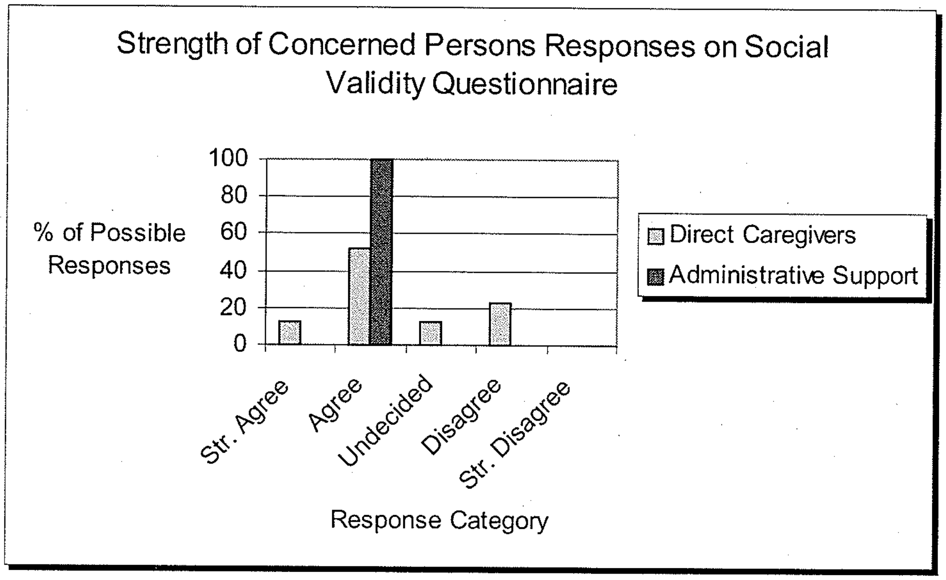


Figure 4.18. The percentage of responses, for each of the five categories of possible response, to the social validity questionnaire, according to the two types of respondents. The graph represents the responses of all seven respondents to all eight statements. The abbreviation *Str.* stands for Strongly.

by both residents and staff, he or she was undecided as to the reasonableness of achieving these goals. This respondent was undecided as to whether or not the DMT was appropriate for the participants, and disagreed that it could be easily provided on the SCU. However the outcome of the DMT was considered by this respondent to be important enough to be worthy of the time and effort of the staff and the participants.

Discussion

Very little experimental research has been conducted in the field of dance movement therapy for persons with dementia. This study may be alone in exploring experimentally a DMT intervention for persons with late-stage dementia of the Alzheimer type. Specifically we explored whether persons with DAT would have positive responses to a DMT intervention. The second focus of the study (to explore if persons with DAT would express previously unrecognized, retained cognitive abilities after a DMT intervention period) remained unexplored due to lack of post-test validity. Despite this failing of the study the data collected provided a wealth of information.

Intrasystem Analyses

The intrasystem analyses showed that two of the participants (Cassie who has moderate to severe dementia; and Bev who has severe dementia) had significantly positive responses to the DMT intervention (as measured by the Positive Response Schedule, PRS; Perrin, 1997). Additionally these analyses showed that Rhonda, who has mild dementia, had an inconsistent response to the intervention. Patrick, who has moderate to severe dementia, did not have a significant response to the DMT. However like the qualitative findings of Wilkinson and associates (1998), our research showed that a DMT intervention promotes a rich emotional environment with potential for quality of life benefits.

Unlike previous research regarding DMT for older persons with cognitive disorders (Berrol et al., 1997; Wilkinson et al., 1998), which used only pre- and post-tests for data collection, we collected data during both baseline and intervention periods. This was an important protocol difference from those previous studies. Despite the findings that the emotional state of both patients with DAT and their caregivers have been shown to improve with dance and creative arts therapies, the limited follow-up research in these psychotherapies and psychosocial treatments suggests that these and other benefits may not persist beyond the duration of the intervention (American Psychiatric Association, 1997).

Arousal

The existence of a rich emotional environment during the DMT intervention was determined by the responses of Bev and Cassie as measured by the PRS sub-component Arousal. This sub-component involved absorbed commitment to an activity (passive or active), smiling and animated expression, as well as attempts to initiate interaction. The importance of emotional and meaningful experience for persons with DAT has been well represented in the literature (Perrin & May, 2000; Callanan, 1994; Lock Gibson, 1994; Johnson et al., 1992; Morgan & Stewart, 1997; Sterritt & Pokorny, 1994; Wald, 1983).

Nemetz (1995) describes the primary principle of DMT as the idea that the body and mind are inseparable. Thus, Nemetz adds, movement can access expressions that have no verbal or cognitive outlet. This was the motive for using the sub-component Arousal to measure the participant's responses. This sub-component represented the participant's *attention* directed to inner motivation or personal communication. Generally these expressions reflected inner needs or interests of the participant. Examples of Arousal behaviors are the participant responding to an interaction with a smile, the participant changing the rhythm of a movement, or the participant absorbed by an event.

Action

The PRS sub-component Action measured the participant's responses as representative of his or her attention directed to outer motivation or social communication. Generally these actions reflected the participant's interactions with his or her environment; for example the participant following the therapist's movements, the participant fidgeting due to lack of engagement, or the participant changing his or her focus of outward attention. Passive behavior of persons with DAT, along with reduced cognitive abilities and reduced emotionality, is associated with reduced interaction with individuals and the environment, and reduced psychomotor activity (Colling, 1999).

The sub-component Action revealed that the DMT program increased Cassie's physical activity as well as her interactions with the environment over what she would normally experience in her daily activities. Bev also showed a significant increase of interaction with the environment. However since the PRS was not sensitive to differences between "exercise directed" and "undirected" actions (i.e., exercise verses fidgeting, or moving one's head to look around) a significant increase in the two PRS categories for physical activity was not seen with Bev. During the study we recognized the need for a measurement tool that could distinguish between physical activities with varying levels of physical benefit. Persons with DAT benefit from planned and directed, movement and exercise with increased mobility (Saxton et al., 1997; Lazowski et al., 1999), improved functional balance, flexibility, and functional ability (Lazowski et al., 1999), long-term retention of acquired motor skills (Dick et al., 1995, Dick et al., 1996), a host of behavioral improvements (Moore et al., 1999; Netz et al., 1994; Namazi, Gwinnup & Zadorozny, 1994; Beck et al., 1992; McGrowder-Lin&Blatt, 1988), as well as cognitive benefits (Friedman & Tappen, 1991; Palleschi et al., 1996).

Nemetz (1995) outlines two other key principles of DMT. These are (1) that behavior is directly related to communication and much of the primary communication of humans is nonverbal, and (2) that adjustments or changes to a person's movement range can effect the person's overall functioning. Thus DMT theory promotes the idea that expansion of a person's movement repertoire can have not only physical but also behavioral and psychological benefits (Cotter, 1999; Hanna, 1995; Pallero, 1995; Bartenieff & Lewis, 1997).

DMT differs from exercise programs in the type of process the therapist and participant experience. Our DMT program for persons with DAT was firmly founded on the fundamental principle of DMT, that there is a reciprocal relationship between motion and emotion (Berrol, 1992). This DMT program was developed specifically to direct the attention of the participants to both movement and expressive possibilities not commonly found in a special care unit. Research has shown that an attention or a discrimination deficit (Perry et al. 1999), which diminishes the drive toward novelty, in persons with dementia may be responsible for much of the apathy in these persons (Daffner et al., 1999). The DMT program used in this study employed the direction of attention to novel experience to enhance the movement and creative explorations of the participants.

Intersystem Analysis

The intersystem analysis strengthened the finding of an intervention effect through direct replication of a significant positive effect among two of the four participants. Although a significant effect among all four participants would have been preferable, the differences among participants revealed some interesting observations. Neither Rhonda nor Patrick had a significant response to the DMT intervention. Considering these results provided interesting insights into the DMT program.

Rhonda

Although the proposed project included participants with MMSE scores below 15 (moderate to severe dementia), the pre-testing with the COGNISTAT showed that Rhonda scored in the area of mild dementia. The DMT program was designed for persons with late-stage DAT; a lower cognitive status than that of Rhonda. The results reflected this. Rhonda had variable interest in the DMT program and was generally no more engaged in the DMT than she was in any of the many other activities she enjoyed. Rhonda's physical capabilities were also much better than the other participants' abilities. There are important differences between persons with mild dementia and those with moderate to severe dementia. These differences are not only in cognitive abilities, but also in psychomotor ability (such as posture and gait, Franssen et al., 1993), developmental reflexes and functional capacity (Reisberg et al., 1999b), executive functions (such as complex goal-oriented tasks and behaviors, Chen et al., 1998), and behavioral and psychological symptoms (Harwood et al., 2000; Reisberg et al., 2000).

Observations of Rhonda during baseline phases showed that she did not lack the ability to direct her attention to engaging activities. Based upon the treatment integrity data of baseline phases (Daily Activity) it appeared that the other three participants did not have Rhonda's acute awareness of the options available on the special care unit. The many differences subsumed by the labels mild dementia verses moderate-severe dementia may have accounted for Rhonda's lack of significant response to the DMT intervention. This error in participant selection may have provided validation that the DMT program was properly designed for the target population.

Patrick

Patrick's almost complete lack of positive response to the DMT intervention over the baseline activities was startling. The lack of significant response by Patrick in the sub-component Action had been somewhat accounted for in the Results. Since it was impossible to differentiate between Patrick's "humming behavior" and dance movement on the PRS scale we could not know whether Patrick responded with increased physical activity to the DMT intervention. This was especially unfortunate as Patrick was the lone male participant in the study. Thus an important question as to the effect of this DMT program on persons of different gender remains unexplored.

Most striking of these results was that Patrick's PRS Arousal score remained nearly without change from baseline to intervention phase throughout the study. Although certain categories of the sub-component Arousal (i.e., *Initiates interaction* and *Happy*) did show increases with the intervention phases the overall result was one of lack of a differential response as compared to any other activity in Patrick's baseline phase. Why were Patrick's responses so passive?

Patrick spent most of his daytime hours on the SCU sitting in the same location nursing a cup of coffee or an unfinished meal. Lower levels of physical activity have been associated with more severe depression in older adults with depression (Moore et al., 1999), while the presence of depression in persons with DAT may be a significant predictor of functional impairment (Fitz & Teri, 1994); however Harwood and associates (2000) found no association between depressive symptoms and functional impairment in person with DAT. Eich (1995) says that memory is more impaired when a person is in a low state of pleasure and a low state of arousal, than when only one of these conditions exists. Therefore inactivity and low arousal for persons with DAT, and a co-existing psychosocial disorder can become a cascade of decline. Reisberg and associates (1996) say that persons with DAT can develop a type of agitation when language abilities break down. These researchers point to behaviour problems that can occur due to the interaction of psychological factors, neuro-chemical changes, or background cognitive disturbance. They identify noncognitive, behavioural symptoms (paranoia, delusions, hallucinations, and some agitations) in persons with DAT that may respond to psychological treatment.

Cohen-Mansfield, Max, and Werner (1992) report on three types of agitation in elderly persons; aggressive behaviour, physically non-aggressive behaviour, and verbally agitated behaviour. They say that researchers need to explore the possibility of delayed posttraumatic stress disorder (PTSD) in nursing home residents who exhibit physically non-aggressive and aggressive behaviours. Although PTSD is commonly understood as recurrent distressing recollections of a traumatic event, it can also manifest as a paradoxical amnesia for aspects of the trauma (Pitman & Orr, 1995). Based upon their research, Reisberg and Heuer (1995) support that in PTSD arousal, learning, and the mechanisms of attention interact at the neurobiological level: While White points out that "...simple extinction will not be a successful treatment for PTSD. Rather, training involving a competing stimulus signaling 'safety,' based on the conditioned inhibition paradigm, may be required for successful behavioral treatment of this disorder" (White, 1995, p. 98).

Other researchers have cautioned that, "...a person with long-standing negative social relations may become aggressive when in a deteriorated state" (Cohen-Mansfield, Max, & Werner, 1992, p. 232). Further they say that such a deteriorated state can be exacerbated by the trauma of "abandonment" such a person may feel upon entry to a nursing home. Importantly, they find that verbal agitation is clearly related to disease, pain, and depressed affect. They consider verbal agitation to be a "...call for help from physical and emotional suffering" (Cohen-Mansfield, Max, & Werner, 1992, p. 233). Harwood and associates (2000) suggest that clinicians should be sensitive to the behavioural and psychological symptoms of persons with later stage dementia, and aware that such persons may have greater difficulty coping with emotional health problems as their dementia progresses.

Possibly Patrick's responses, to both the Daily Activity (baseline condition) and the DMT (experimental condition), can be viewed with a psychological perspective (i.e., depression or PTSD). Such a situation would suggest that Patrick's non-responsiveness requires, not an abandonment of therapy, but rather an organized implementation of available psychosocial treatments such as DMT. However it is important to recognize the difference between programs directed at normal emotional responses (e.g., sadness or loneliness) and those developed to address maladaptive or negative affective states (Lawton et al., 1996).

Dance movement therapy employs a wide range of sensory channels revealing both emotional and intellectual communication through body movement (Mohacsy, 1995). This nonverbal communication is the direct method the therapist uses to develop attunement with the client. This attunement with the client becomes the framework of a relational process of synthesis and adaptation (Pallaro, 1996). Persons with DAT can benefit from this process specifically because it is a subjective experience. Pallaro says that the development from subjective self-awareness, to the experience of states of mind and body, to interactional movement allows the client to experience a range of possible expression. The dance movement therapist helps to motivate an individual to find an acceptable identity and satisfying mode of behaviour that is in relation to his or her social network, such that a context of flow between internal and external states can be actively maintained (Bartenieff & Lewis, 1997).

Thus the attunement or flow the dance movement therapist would develop with a non-responsive person could enable the resolution of conflict and the establishment of adaptive behaviours despite the cognitive disadvantage of dementia. This process would involve intensive DMT directed differently than the one used in this study. The DMT program for persons with DAT used in this study was aimed at direction of attention toward movement, expressive, and creative possibilities of persons "normal" affective states. A DMT program aimed at a person with DAT who displayed considerable maladaptive behaviour would be somewhat different. Beyond exploration and expression such a program would provide encouragement and opportunity for alternative expressions of emotional needs.

This brief and succinct description is enough to reveal basic differences between such a DMT program and the one used in this research. The program as implemented in this research project did not make judgments regarding the adaptiveness of the participant's movement and emotional patterns. Rather, the basic objective was to bring the participant's attention to his or her movement and emotional explorations. The overriding goal was to enhance the possibility for the emergence of a state of personhood. A DMT program aimed at emotional adaptation would be designed to help the client recognize and resolve conflicts in movement and expressive patterns that have been exacerbated by the progress of dementia. Resolution of these conflicts through DMT would enable new patterns of adaptive behaviour to emerge.

> Inner conflict is the result of competing claims on attention. Too many desires, too many incompatible goals struggle to marshal psychic energy toward their own ends. It follows that the only way to reduce conflict is by sorting out the essential claims from those that are not, and by arbitrating priorities among those that remain. There are basically two ways to accomplish this: what the ancients called the *vita activa*, a life of action, and the *vita contemplativa*, or the path of reflection (Csikszentmihalyi, 1990, p. 225).

Social Validity

Social validity is a multidimensional construct (Foster & Mash, 1999), thus the results of this evaluation were not a simple as—yes the findings were socially valid (or not). Overall the evaluation was that indeed the intervention had social validity. After all, each of the participants queried said they enjoyed the DMT, found reasons for that, and said they would like to do it again! There was no way to measure the participants' veracity regarding these opinions. Did they say these things because they chose to be polite, they didn't know what to say and it was an easy response, or they remembered that they had genuinely enjoyed the sessions? One cannot say which of these possibilities is more truthful. What can be said is that given the opportunity to complain they did not. None of the participants responded to the questions with issues of being observed (although this had been an issue during the early phases of the project), of disruption of their routines, and of unpleasant and unusual activity. What was said was that the DMT filled a void on the SCU, that it activated and motivated, and that it involved thinking. These participants validated the goals (enjoyed it?), the procedures (what was enjoyed), and the outcomes (why it was enjoyed) of the DMT program, as acceptable and important enough for them to participate in.

That said, a comment on reliability and validity is necessary. The questionnaire used was a qualitative measure without established reliability or validity for use with persons with DAT. However, this type of open-ended social validity interview has been used with persons with intellectual disabilities (Mahon, 1994).

Most of the responses on the *concerned persons questionnaire* were positive. There was strong support for the acceptability and importance of the goals of the DMT program, and the importance of the anticipated outcomes. The respondents were divided as to the acceptability of the DMT procedures. Although most of the respondents agreed with the appropriateness of the DMT procedures, they were divided as to the ease of implementation on a SCU. The phrase “provided easily”, in the statement 2 (Procedures), was meant to determine the acceptability of the procedure to busy staff. This was likely what some respondents found disagreeable. Possibly it should have been clearer *who* would provide the program. Therefore it is difficult to know whether the objection was to the offering of the program on the unit, or the expectation that current staff should offer the program.

One respondent accounted for a large percentage of the disagreement found in the evaluation. This respondent considered the goals important and acceptable, and the expected outcomes important for both staff and residents Therefore most of the respondent’s disagreement laid in the area of program procedures. Given the respondent’s comments regarding the disruption caused by the nature of the research project it was suspected that the respondent was unable to separate the DMT program from the research constraints. This was an unfortunate reality of the research design. This consideration gave new meaning to Patrick’s comment “Because I was separating the dance I get a chance to see it” (Patrick, 2001).

The social validity evaluation was limited by two main factors. First, one of the participants was taken away to an appointment immediately after her last session. She was unable to remember the sessions when asked on another occasion. Second, and especially important, the sample of concerned persons was exclusively staff. Additionally all, but one of the seven staff (a rather small sample), were direct caregivers. This was very disappointing; as the opinions of family and friends or other staff could have produced a richer exploration of how this innovative DMT program may or may not benefit residents, staff, and caregivers.

Implications

Research

Although little research has been conducted in the field of DMT for persons with DAT, this study has shown that DMT may have therapeutic potential for these persons. Exercise has long been recognized as beneficial for persons with DAT. More recently the importance of emotional experience for these persons has come into the spotlight. Lawton (1997) says that a non-personhood perspective has biased those working in this field of health care to not recognize the importance of their clients' affective states. Lawton adds that as those in the field move to embrace this area of quality of life there will be a need for assessments and interventions for what is primarily a subjective, inner experience. DMT is ideally situated to rise to the occasion because subjective, inner experience is traditional territory for dance movement therapists. Recently assessment procedures and theories used in DMT have received scrutiny (Karkou & Sanderson, 2001; Chaiklin, 1994), and critical reviews and analyses of DMT research have been conducted (Ritter & Graff Low, 1996; Cruz & Sabers, 1998; Chaiklin, 1997).

Practice

DMT practitioners are currently expanding the parameters of the field beyond mental health care into complementary medicine and social activism (Dosamantes Beaudry, 1997). This study, like many others in DMT, has looked at a population that is hardly homogenous: But even the subjective inner experience of persons with dementia if expressed, can be measured. Articles continue to appear in the field of dementia care advocating a new approach to care and communication. More recently clinicians in the field have called for a method of "deciphering the (body) language code", a deeper exploration of the meaning behind "challenging behaviour", and collaborative research (Archibald, 1999). DMT continues to be at the forefront of understanding body language and meaning and has had a long history of collaborative research. Only recently has this research focused on an area of DMT practice that played a significant role in the development of the field of DMT.

Theoretical Foundation

What is *Personhood* and how exactly does one know when it is present? This question served as the basis for the establishment of a theoretical foundation in Dynamical Systems Theory. Kitwood (1997) said that personhood is not a matter of adding a new thing or two to the experience or environment of a person with dementia. He said we must look at every feature of the person and his or her environment in a different way. This is what a dynamical systems approach provided. The concepts of self-organization (selective coordination), nonlinear change, and the probabilities of stable and unstable states restructured the knowledge of the apathetic, passive, and challenging behaviours of persons with DAT. Personhood was reframed as an emergent property of the self-organization of brain and body within a social-emotional interaction.

Dynamical systems theory offered a structure to understand the literature about, and the experiences of persons with dementia. From this the collective variables of action and arousal were recognized as candidates of successful interventions with persons with DAT. Thus it seemed that personhood emerges from an increasing complexity of physically active and emotionally arousing social interactions. The uniqueness of each system (each person and environment) requires that this complexity of experience be tailored to the system. Therefore an intervention such as DMT, which is implemented by attunement with the client, is ideally suited to guide the client through such an experience. Applying an intervention with activity and emotionality is not sufficient. The person with DAT must have their attention drawn to these experiences in a manner that involves key neural networks in his or her brain.

A number of questions regarding the pattern dynamics where not addressed by this study: When is the system stable or not; what are the parameters that control shifts in and out of stabilities? The planned analysis of the cognitive tests was to look for patterns of stability amenable to further study. Although this was not possible, the success of positive response to the DMT intervention suggested that the variables action and arousal, as stimulated by the DMT, are successful components of stimulating attention and response by persons with DAT.

Limitations

Various problems that arose during the implementation of the study necessitated changes to the procedures. The most notable and unfortunate situation was the lack of validity of the post-tests of the cognitive function of the participants. Although we did not anticipate improvements in cognition, we had hoped the comparisons would enlighten areas of retained abilities in the participants. The rationale was that the DMT program would have provided stimulation of those retained abilities such that they would become more cogent. A related problem then was the sample selection. Had the cognitive tests been conducted within an adequate time frame, sample selection would have remained a problem. The lack of consistency in selection of persons with late-stage DAT limited the external validity of the findings. The use of different cognitive measurement tools (the SIB, Saxton and Swihart, 1998; the

COGNISTAT, Northern California Behavioral Group, 1988) would have threatened the internal validity of the findings. Finally the selection of participants with late-stage DAT was an important criterion as the DMT program had been developed specifically for persons with late-stage DAT.

The third limitation of the study comes from the choice of the PRS (Perrin, 1997) as the main measurement instrument. The PRS was insensitive to differences in movement qualities. This resulted in movement that expanded range of motion, expressed important communication, or was a new accomplishment receiving equal weight as movement used for distraction, or as an outcome of agitation. Perrin (1997) developed the PRS for the observation of all responses of persons with severe DAT. She considered that any motivated movement, vocalization, engagement, and so on, was a positive response by persons with DAT to their environment. Therefore the fault is not with the scale but rather with our desire for precision it was not designed for. One of the DMT measurement instruments could have been used, but training research assistants in the use of these would have been a formidable undertaking. Possibly more suitable scales exist that do not involve such specialized knowledge. This is certainly a consideration for further research.

Another unfortunate difficulty that developed after the study began was the necessity to adjust the DMT program to individual sessions from the original group protocol. This was done due to personality conflicts among the participants. This related particularly to Patrick's compulsive humming behaviour, which irritated the other participants. The change to an individual session protocol resulted in a loss of many of the interactive and social goals designed into the DMT program. Additionally, a longer period of DMT had been planned to allow for possible longer-term effects. The change from group to individual protocol, economics, and the nature of the specific SCU each contributed to the decision to shorten the intervention sessions. Although the short 20-minute sessions were adequate to observe positive responses in the participants, 15 to 20 minutes cannot be considered to be adequate time to fully experience the potentials of DMT. Past experience with groups of persons with late-stage DAT showed that they were capable of and enjoyed a 45 to 60 minute session.

Finally, in this list of limitations is the location of the study. The SCU where the study took place may have been somewhat different than those found elsewhere and this may influence the generalization of the findings to persons with late-stage DAT in other SCUs. The SCU for this study may not represent all other SCUs for at least two reasons. First, this SCU is a transition unit for persons with dementia awaiting a permanent placement. Second this SCU has been the site of many ongoing research projects for some time. Thus, there was some difficulty engaging the SCU staff in supporting the scheduling requirements of the project. Further on into the project it became clear that the presentation to the staff, done before the project began, had not adequately prepared the staff to support the program. The PCM was sympathetic and had changed one aspect of the unit management to solve certain problems that had occurred during the research project. Kovach and Krejci (1998) have addressed the importance of staff education and administrative reorientation in the care of persons with dementia. They say that the basis of good dementia care is communication, involvement and, empowerment.

Future Directions

The findings, as well as the experience of implementing this study have suggested a host of ideas for future research, clinical practice, and theoretical musings. Due to a lack of control over participant selection the issue of cognitive level was partly revealed in this study. Future studies could assess directly the designing of DMT programs for persons with different levels of DAT. Related to this concern could be the designing and results of programs for persons with DAT who reside in the community. A large area of interest that was revealed in this study was that of persons with DAT who have maladaptive behaviours. Research in this area could look at DMT for persons with DAT and other conditions such as schizophrenias, PTSD, depression, and physical, cognitive or sensory impairments. Finally, future research could be done to assess the original group protocol. All potential DMT programs need to be considered on the variable of either group or individual protocol, which involves considerations for both the participant's needs and the availability of resources.

Hopefully recognition and acceptance of the principles and practice of DMT will become more widespread in the field of care of persons with DAT. This would enable the rich understanding of the body/mind connection and expansion of one's movement vocabulary foundational in DMT to be made a common practice. Like other complementary therapies DMT, could be an integrated part of a SCU. The dynamic nature of DMT ensures flexibility to practical requirements and so would able to compliment the fields of occupational and physical therapy, therapeutic recreation, as well as the diverse directions of nursing. DMT programs on a SCU would be well suited to contribute to a clinical team for diagnosis of possible psychological or emotional dysfunction.

A resident dance movement therapist could provide DMT for both residents and staff. The DMT process enables enhanced self-awareness, as well as awareness of others in the environment. This would be especially beneficial for an area of geriatrics that has a high staff turnover, as is found in caring for persons with dementia. DMT and creative dance have been used with non-compromised persons in other fields for body awareness and stress release activities (Education, Koren, 1994; Parenting, Loman, 1998; Murphy, 1998).

Dynamical systems theory was very useful for thinking about many of the abstract ideas such as personhood, quality of life, and self-awareness. Dynamical systems theory, as a theoretical foundation withstood the rigor of the research protocol. Both action and arousal were shown to be important comoponents in the positive response of persons with DAT to DMT. Therefore both this theoretical foundation and these coordinative components are worthy of further research. Possibly these components can be reviewed in ongoing programs (such as those in TR). The view of personhood that came out of my use of dynamical system theory was useful for my understanding of the DMT process and the experience of dementia. Other studies could be done to discover the coordinative structures and controlling parameters of emergent personhood. This information would help patient care managers to design routines and programs that maintain the appropriate range of activation (personhood) for each resident with DAT.

The formal validation of personal experience is always fraught with insecurities of whether the reality of the experience has been captured. This is how I leave this thesis: Wondering if the depth of richness of DMT with persons with DAT, when not within the research paradigm, can be captured and measured. This study has shown that the responses of persons with late-stage dementia of the Alzheimer type to a dance movement therapy program can be measured and are positive. After many years of playing, dancing, and moving with these gracious people I think I have received much more than I gave.

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Appendix A

Family or Guardian Consent Form

Dear Family Member or Guardian,

I am Elaine Pelletier, a graduate student in the Department of Physical Education and Recreation Studies at the University of Manitoba. I am writing this on behalf of a research group of which I am the primary researcher. We would like your consent for your family member or ward to participate in our research study called Dance *Movement Therapy for Persons with Dementia of the Alzheimer Type: A Dynamical Systems Perspective of Personhood.* We will observe, document, and describe what are hoped to be the therapeutic potential of a dance movement activity for people with late-stage dementia of the Alzheimer type. We would like your family member or ward to participate in the: (a) cognitive assessments, (b) preliminary, short video training-tape session, (c) two daily activity observation phases, and (d) two dance movement activity phases, of this study. We would like as well to consult your family member or ward's medical records to obtain the most recent measure of his or her cognitive status (a Mini Mental State Examination score).

The senior occupational therapist at Riverview Health Centre will do two sets of cognitive testing using a reliable cognitive assessment instrument. This instrument is designed to measure the retained abilities of persons with late-stage dementia. This cognitive testing takes approximately twenty minutes and uses an interview format where the person being tested is asked to answer some questions and manipulated a few simple objects.

The preliminary videotaping will include ten minute periods of each of the following: (1) the participants' normal daily activities on the special care unit, and

(2) the participants' involvement during a dance movement activity. This videotape will be used to train two research assistants to use a measurement schedule of the responsive behavior of persons with late-stage dementia. This specially designed, measurement schedule will be used by the research assistants, while observing the participants' activities, to record these observations.

The entire study will consist of four observation phases. The first phase will involve the observation and recording of the responses of four participants with dementia during their usual activity for three one-hour periods each week for a minimum of two weeks. The second phase of the study will involve the participants with dementia taking part in a dance movement activity for one hour three times a week for a minimum of two weeks. Each one-hour period will be on separate days. The third phase of the study will be a repeat of the first phase of daily activity observation. The fourth phase of the study will be a repeat of the second phase of the same dance movement activity. These third and fourth phases will last also a minimum of two weeks.

A dance movement session will consist of seated and standing dance movement exercises and explorations. Taped music is an integral part of these sessions. The dance movement therapist and primary researcher Elaine Pelletier developed this activity over two years to be both within the capabilities of, and enjoyable to people with late-stage dementia. The physical, mental, or emotional risks to persons with dementia in this activity are no more than those experienced in any other therapeutic recreation activity engaged in on the special care unit.

At the end of the fourth phase Elaine Pelletier will conduct a very simple and short questionnaire with your family member or ward regarding his or her experience in the dance movement program. As well Elaine Pelletier will also conduct a questionnaire with the caregivers (nurses, health care aids, family member etc.) of the study participants. This questionnaire asks for participant's and caregiver's opinions of the dance movement activity so as to examine the social validity of such an activity for persons with late-stage dementia. You may take part in answering a questionnaire if you are interested in doing so.

If you, or your family member or ward feels at any time and for any reason that either of you cannot continue with the study, you or he or she may decline participation or withdraw immediately. All aspects of this study will not involve any risk of harm, physically, mentally, or emotionally, greater than that which your family member or ward might experience in the normal conduct of his or her everyday life. Every effort will be made to ensure pleasant experiences for your family member or ward.

This study is part of the requirements that Elaine Pelletier must fulfill for a Master in Science from the University of Manitoba. The researchers in this study may produce a report of the findings to be submitted for publication in a relevant peer reviewed journal.

All data will be confidential regarding individuals. Pseudonyms will be used if data on individuals needs to be identified As well, all data will be kept in a secure location. Data includes consent forms, field notes, video-tapes, questionnaires, all information from measurement schedules and testing, and subsequent analyses. The researchers and research assistants will be responsible to keep their data, as well as any data shared between them, confidential and secure. After the study and analyses are complete the videotapes will be destroyed. Also at this time you will be provided with a brief report of the findings of the study.

The Education/Nursing Research Ethics Board of the University of Manitoba has approved this study. Any complaint regarding any procedure of this study may be reported to the Human Ethics Secretariat (474-7122), or the Acting Head of the Graduate Program of the Department of Physical Education, Dr. Kelly McKay (474-7058) for referral to the appropriate Ethics Board.

We would like you to consider all the above information. Please do not feel obligated to give your consent. Should you consent for your family member or ward to participate we will verbally make a request of him or her to participate in the dance movement sessions. If he or she should refuse we will honor that decision despite your consent. At any time you or your family member or ward may decide to cease participation. There is no obligation to continue or retribution for leaving the project. Thank-you for reading this letter and considering our research.

If you have any questions or concerns you may contact the following researchers.

Elaine Pelletier
Graduate student, University of Manitoba
Primary researcher
453-6686

The person listed below has a supervisory position in relation to this research.

Dr. Michael Mahon
Dean, Faculty of Physical Education and Recreation Studies, University of Alberta
1-780-492-3364

Dr. Mahon is Elaine Pelletier's graduate advisor.

If you have read and understood this letter of permission, and would like to give consent for your family member or ward to participate in this study called *Dance Movement Therapy for Persons with Dementia of the Alzheimer Type: A*

Dynamical Systems Perspective of Personhood please sign and date in the space provided. Also please provide the name of your family member or ward and identify your relationship to him or her in the spaces provided. You may keep the copy of this letter for your records.

On this day ______________________I ___________________ _____have read the information regarding the study *Dance Movement Therapy for Persons with Dementia of the Alzheimer Type: A Dynamical Systems Perspective of Personhood.* I understand the study involves providing access to my family member or ward's most recent Mini Mental State Examination score, the observation, videotaping, and cognitive testing of, as well as the participation in a dance movement program by, my family member or ward, and the verbal questionnaire of social validity for my family member or ward to answer—if I should give my consent. I also understand my family member of ward will be asked to assent to participation in the study.

As well, I have read this letter of consent and understand that by signing this letter of consent I give consent for my family member or ward to participate in this study. I understand that this consent is voluntary and that this consent can be removed at any time without prejudice or consequence. I also understand that I am not required to answer any questions at any time. I realize that my family member or ward may his or her self withdraw from the study at any time and refuse to ask questions at any time without prejudice or consequence.

Participant's Name ____
Relationship to Participant ___________________________________

Family Member's or Guardian's Signature_________________________
Date ____

Researcher's signature
Elaine Pelletier ______________________________ Date ______

Thank you again for your consent for and your family member or ward's participation in what we hope will prove to be valuable research.

Appendix B

Concerned Persons Social Validity Questionnaire

Social Validity Questionnaire

This three-page questionnaire makes brief descriptions of the goals, procedures and outcomes of the dance movement program that the person you know has participated or is participating in. The descriptions are each followed by short statements. You are asked to circle the choice that best describes your agreement or disagreement with each statement.

Description of program goal:

The primary goal during the "dance movement program for persons with Alzheimer type dementia" is for the participant to experience and express an increase in physical activity and emotional expression.

Statement 1: I think this goal reflects the needs of the person I know.

Strongly Agree	**Agree**	**Undecided**	**Disagree**	**Strongly Disagree**
(5)	(4)	(3)	(2)	(1)

Statement 2: I think this goal is reasonable to achieve.

Strongly Agree	**Agree**	**Undecided**	**Disagree**	**Strongly Disagree**
(5)	(4)	(3)	(2)	(1)

Statement 3: I think this goal is worthy of the time and effort necessary to achieve it.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
(5)	(4)	(3)	(2)	(1)

Statement 4: I think this goal would be an important achievement for the person I know.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
(5)	(4)	(3)	(2)	(1)

Description of program procedures:

The dance movement session consists of both seated and standing movement to music. Each session includes: introductions and greetings; a warm-up section with guided breathing and head to foot seated movement; standing whole body movement such as swinging, twisting, and reaching; partnered stepping and turning in space; and interactive movement, including a creative expression section. The session ends with gentle calming movements, discussion, and farewells. Although group sessions are possible this program involved one person with dementia and one dance movement therapist at each session.

Statement 1: I think this dance movement activity is appropriate for the person I know.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
(5)	(4)	(3)	(2)	(1)

Statement 2: I think this dance movement activity could be provided easily on any special care unit.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
(5)	(4)	(3)	(2)	(1)

Description of expected program outcome:

The dance movement program is designed to enhance positive activity and emotional response so as to reveal and extend other retained abilities of the person with Alzheimer type dementia.

Statement 1: I think the outcome explained above is worthy of the time and effort of staff at the health care centre.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
(5)	(4)	(3)	(2)	(1)

Statement 2: I think the outcome explained above is worthy of the time and effort of the person I know.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
(5)	(4)	(3)	(2)	(1)

The remainder of the questionnaire is to provide us with some information regarding your relationship to the person taking part in the dance movement program.

1. Please check which category best describes your relationship to the participant.
   a. family_______
   b. friend_______
   c. health centre direct caregiver___________
   d. health centre indirect caregiver__________
   e. health centre administrative support______
   f. other________

2. Please check the category which best identifies how long have you known the participant.
   a. less than one month_________
   b. less than six months_________
   c. less than one year___________
   d. less than two years__________
   e. two years or more___________

3. Was the participant known to you before he or she became a resident at the health care centre?
   a. Yes_________
   b. No_____

Please make any further comments here or continue on the back if necessary. Thank-you very much for completing this questionnaire.

Appendix C
Concerned Persons Consent Form

Dear Concerned Person,

I am Elaine Pelletier, a graduate student in the Department of Physical Education at the University of Manitoba. I am writing this on behalf of a research group of which I am the primary researcher. We would like your consent to answer a short questionnaire as part of a research study called Dance *Movement Therapy for Persons with Dementia of the Alzheimer Type: A Dynamical Systems Perspective of Personhood.* We will observe, document, and describe what is hoped to be the therapeutic potential of a dance movement activity for people with late-stage dementia of the Alzheimer type. As a family member of the participant, or as a staff member at Riverview Health Centre, or as an other concerned person who has direct and frequent contact with one or more of the dance movement group participants we would like your opinions regarding their involvement in the dance movement program. This questionnaire will take approximately five minutes. If you feel for any reason that you do not want to answer this questionnaire you can decline to be included at any time (even during or after completion of the questionnaire). The questionnaire will not involve any risk of harm, physically, mentally, emotionally, or professionally to you.

All your answers to the questionnaire will be kept secure and confidential. You will not be identified in any way during the analysis and reporting of the findings. Each completed and consented questionnaire will be part of the information included in the analysis of all data gathered during the study. Each researcher will be responsible to keep all data confidential and secure. After the completion of the study you will be provided with a short summary of the findings. The findings of the study may be submitted for publication in a relevant peer reviewed journal. Elaine Pelletier's involvement in this research is part of a Master of Science (Physical Education) requirement.

The Education/Nursing Research Ethics Board of the University of Manitoba has approved this study. Any complaint regarding any procedure of this study may be reported to the Human Ethics Secretariat (474-7122), or the Acting Head of the Graduate Program of the Department of Physical Education, Dr. Kelly McKay (474-7058) for referral to the appropriate Ethics Board.

We would like you to consider the information in this letter of consent. Please do not feel obligated to give your consent. Should you consent you may withdraw from answering the questionnaire, or any part of the questionnaire, at any time. There is no obligation to continue or retribution for withdrawal. Such withdrawal will also be kept confidential. Thank-you for reading this request, and considering our research.

If you have any questions or concerns you may contact the following researcher.

Elaine Pelletier
Graduate student, University of Manitoba
Primary researcher
453-6686
The persons listed below have a supervisory and or research positions in relation to this study.

Dr. Michael Mahon
Dean, Faculty of Physical Education and Recreation Studies, University of Alberta
1-780-492-3364
Dr. Mahon is Elaine Pelletier's graduate advisor.
Ms. Lynda Wolf
Senior Occupational Therapist, Riverview Health Centre
478-6298

Elaine A. Pelletier–Dance movement therapy for persons with dementia.

If you have read and understood this letter of permission, and would like to answer the questionnaire as part of the study called Dance *Movement Therapy for Persons with Dementia of the Alzheimer Type: A Dynamical Systems Perspective of Personhood* please sign and date in the space provided.

> **I have read this letter of consent and understand that by signing this letter I give my consent for my responses on the following questionnaire to be used as the social validity part of the study *Dance Movement Therapy for Persons with Dementia of the Alzheimer Type: A Dynamical Systems Perspective of Personhood.* I also understand that this consent can be removed at any time.**
>
> Person's Signature________________________________
>
> Date__________________
>
> Person's Name_______________________________
>
> Researcher's signature
>
> Elaine Pelletier__________________________ Date ___________

______

Thank you again for your participation in what we hope will prove to be valuable research.

Appendix D

Original Positive Response Schedule (Perrin, 1997)

Name............ ....

Date.............. ....

Unit................ ....

Intervention.... ....

Photograph

Annual

BDM	
DHM	
VOC	
LE	
LC	
II	
ENG	
HAP	
SAD	
FEA	

Overall score | | Response total

Baseline score | | Baseline total

Intervention score | | Intervention total

Post-intervention score | | Post-intervention total

Deliberate body movement	
Deliberate head movement	
Vocalization	
Looks at environment	
Looks at carer	
Initiates interaction	
Engagement	
Happy	
Sad	
Fear	

Deliberate body movement	
Deliberate head movement	
Vocalization	
Looks at environment	
Looks at carer	
Initiates interaction	
Engagement	
Happy	
Sad	
Fear	

Deliberate body movement	
Deliberate head movement	
Vocalization	
Looks at environment	
Looks at carer	
Initiates interaction	
Engagement	
Happy	
Sad	
Fear	

Appendix E

DMT Treatment Integrity Checklist

Seven pages with a total possible score of 34.

Treatment Integrity Checklist-Phase B-Page 1

Date and Time:__________________________________

Recorder:_____________________________________

Participant:____________________________________

Dance Movement Therapy Program

1. ***Introductions and Greetings**:
    - **Participant and therapist are seated in armed chairs.** ______________
    - **Participant is greeted.**____________________
2. **Opening: Focus on Repetition:** These sequences are repeated many times. If the group shows a degree of comfort with the sequence an advanced variation may be added onto the initial sequence. The initial sequence is always done first and makes up the larger portion of each section.

*__Breathing:__ All participants are seated. Beginning with hands in lap, palms up we lift our palms toward our heads while breathing in. At the top of the breath we turn our palms down and push our hands down and out toward our knees (out breath). This is repeated.

- **Sequence is correct.** ____________________
- **Sequence is repeated.** ______________

****Advanced variation:*** Sequence is repeated with the a gradually widening and progressing upward until the movement is initiated from chest level to above the head where arms and palms turn downward and stretch out to the sides, returning to our laps.

- **Advanced sequence used.** ________________

Treatment Integrity Checklist-Phase B-Page 2

Date and Time:______________________________________

Recorder:____

Participant:____

<u>Seated Warm-up:</u>

***Hand and Arm Stretch:** All participants are seated. We reach our right arms, palms up out in front of our bodies at slightly below chest level. Then we turn our palms down and return our arms and hands to our bodies (staying within the same level). We rest this arm in our laps as we repeat the sequence with our left arms.

- **Sequence is correct.** _______________________
- **Sequence is repeated.** ________________

Advanced variations: (a) The sequence is repeated with our hands held is varying positions (i.e., closed fists, open fingers, palms or back of our hands pushing through the longitudinal plane) (b) After reaching toward the front we reach in the horizontal plane to the side of our bodies, then in the coronal plane until our arms are overhead, and then in the longitudinal plane in front of our bodies. (c) We do the original sequence but alternating our arms without the moment of rest (i.e., one arm reaches out while the other is returning to the chest). (d) Where our wrists circle (singly, in unison, or alternately) as we raise our arm up in front of our bodies and back down to our laps.

- **Any of the four advanced sequences used.**___________________

***Foot and Leg Stretch:** All participants are seated slightly forward in their chairs to facilitate movement in the hips. Some participants may choose to hold onto the arms of their chairs We reach our right legs placing our heels on the floor straight in front of us. We return our feet toward our bodies and repeat with our left legs.

- **Sequence is correct.** _______________________
- **Sequence is repeated.** ________________

Treatment Integrity Checklist-Phase B-Page 3

Date and Time:______________________________

Recorder:______________________________

Participant:______________________________

***Advanced variations:** (a) Our heels are placed to about a 45-degree angle from our bodies' centerline. (b) Using the original sequence we add our same side (ipsilateral) arm. This arm movement is the same one used in Hand and Arm Stretch. (c) Using the original sequence we add our opposite side (contralateral) arm with the Hand and Arm Stretch sequence.

- **Any of the three advanced sequences used.**_______________

***Knee Lift and Leg Stretch:** All participants are seated back into their chairs again to provide support. We gently wrap our hands under our right thighs near our right knees. We draw our right knees toward our chests and then straighten our right legs comfortably. We bend our right knees again returning our legs to the starting position. We repeat by alternating legs.

- **Sequence is correct.** ____________________
- **Sequence is repeated.** ______________

**Advanced variation:* When we first lift our right legs we cross them over the knees of the left legs. Then we kick out our right leg from our knees returning our right feet to the floor. Repeated by alternating legs.

- **Advanced sequence used.** ________________

3. **Theme Exploration: Focus on Rhythm:** These sequences also receive repetition although the focus is on the rhythm of the sequence and the rhythmical transition between sequences.

<u>Standing Whole Body Movement:</u>

***The swinging sequence** involves us taking a shoulder or wider stance. From this position we swing our arms (in unison) from side to side in front of our bodies.

- **Sequence is correct.** ____________________
- **Sequence is repeated.** ______________

Treatment Integrity Checklist-Phase B-Page 4

Date and Time:____________________________________

Recorder:_______________________________________

Participant:______________________________________

***The twisting sequence** involves a transition from the swinging sequence to a movement where we wrap our arms around our torso as we twist from side to side; continuing the established rhythm, as well as the weight shifting.

- **Sequence is correct.** ______________________
- **Sequence is repeated.** _______________

***The reaching sequence** involves stretching our arms in a three-part pattern. While maintaining the rhythm and weight shifting, we stretch our arms upwards along our bodies, downwards with a lean to our sides (both in the coronal plane); and then through the horizontal plane at chest level we stretch our arms to the contralateral side of our bodies. We repeat this alternating the pattern from right to left.

- **Sequence is correct.** ______________________
- **Sequence is repeated.** _______________

<u>Partnered Dance Steps:</u> Each of next sequences are done with a partner (either with the D/M therapist or one of the other resident participants). Occasionally this is an opportunity for turn taking with the D/M therapist while other participants have a short rest.

***Side to side:** Holding hands and facing each other the partners step right and then back to the left. This progresses to more consecutive steps to the right then to the left.

- **Sequence is correct.** ______________________
- **Sequence is repeated.** _______________

Treatment Integrity Checklist-Phase B-Page 5

Date and Time:________________________________

Recorder:________________________________

Participant:________________________________

***Crossing step:** The cross step is a continuation of the side step but the step to the right is followed but crossing the left foot to the right of the right foot (crossing over the right foot). Weight is then transferred to the left foot allowing the right foot to return to the initial stance. This is repeated while moving toward the right. Upon reaching a comfortable distance the sequence is repeated moving toward the left, thus crossing the right foot in front of the left. The entire sequence can be repeated by crossing behind.

- **Sequence is correct.** ____________________
- **Sequence is repeated.** _______________

****A further variation*** is to cross first in front and then behind (vine step) with the left foot while moving to the right and with the right while moving to the left.

- ***Advanced sequence used.*** _________________

***Turning:** Rotating our bodies in space varies in difficulty for persons with dementia. Some will accomplish this without assistance while others will need assistance. The method for this assistance is to use hand, shoulder, and back bodily cues to orient the person to the direction of turning. Thus the D/M therapist begins by facing the person and holding hands with him or her. We practice shifting to a shoulder-to-shoulder stance while letting go of the open side hands. This progresses to a back-to-back stance (maintaining back and shoulder contact) while letting go of the held hands and reaching to grasp with the open hands. The turning movement continues as we turn toward the grasped hands, returning to the initial position. Repeat in the opposite direction.

- **Sequence is correct.** ____________________
- **Sequence is repeated.** _______________

Treatment Integrity Checklist-Phase B-Page 6

Date and Time:_______________________________________

Recorder:____

Participant:____

4. **Theme Exploration: Focus on Awareness:** These sequences involve more individualized repetitions; requiring an effort to hold the movement briefly in memory (although this ability varies and assistance is continual if needed). Additionally this section encourages individual expression and the opportunity for creative thought and movement.

*__Group Movement__: At this point participants are often ready to stand-up again. We may move our circle elsewhere, or simply move the chairs back to give us more room. This group movement in a circle builds upon many of the stretching and stepping done to this point. Specific movement are not always followed as the therapist is open to cues from the group; using bodily and visual sensitivity to respond to their movement qualities.

- **A sequence is developed.** _________________________
- **Sequence is repeated.** ______________________

*<u>Creative Movement Expression:</u> This provides the participants with a truly challenging experience. Within the circle the therapist will take a specific posture (determined by the nature of the session) and suggest to one participant to copy the posture. Then the therapist offers clues to how the participant might change the posture through some sort of movement. Clues are not always necessary; this depends on the person. All group participants are then encouraged to copy the person's movement response. The posture and movement request sequence is then repeated with the next person. Depending on the time this part takes we may put these movement together after each person has had a turn creating.

- **A sequence is developed.** _________________________
- **Sequence is repeated.** ______________________

Treatment Integrity Checklist-Phase B-Page 7

Date and Time: ____________________

Recorder: ____________________

Participant: ____________________

4. **Closing: Focus on Interdependence:** In this section we reorganize into a standing circle to move once again as a group in unison.

*<u>**Group Oriented Movement:**</u> This sequence can be adapted to sitting if necessary (as all sequences can). This sequence promotes a common movement quality in all participants. We reach into the circle toward each other (slightly above shoulder level) as we take one step (right foot) into the circle. We then shift our weight back onto our left feet; we draw our arms into our bodies giving ourselves a hug. We repeat this many times. Then we hold hands as we side step around the circle in one direction, and then the other direction. We repeat with a reach into the circle, and up to above our heads, open our arms to our sides. And repeat as needed.

- **Sequence is correct.** ____________________
- **Sequence is repeated.** ______________

4. ***Discussion and Farewells:** The participants often like to help return the room to proper order. During this time we chat and thank each other for the experience. At this time some participants become emotional or affectionate; all generally continue to 'hang around'.

Good-bye to the participant.____________________

Appendix F

Daily Activity Treatment Integrity Checklist

Seven pages with a possible score of 15 in each category.

Date and Time:______________________________
Recorder:__________________________________

Daily Activity Observation

Set One
Participant (1)_______________
(a) Participant is Sitting__________ Standing________ Activity____ __________ Walking_________ Singing_________ Conversing_ _____ Self Talk________
(b) Participant interacts with another resident. ______________
(c) Participant interacts with a caregiver or staff. ______________
(d) Participant appears to be dozing. ____________________

Set One
Participant (2) _______________
(a) Participant is Sitting__________ Standing________ Activity____ __________ Walking_________ Singing_________ Conversing_ _____ Self Talk________
(b) Participant interacts with another resident. ______________
(c) Participant interacts with a caregiver or staff. ______________
(d) Participant appears to be dozing. ____________________

Set One
Participant (3) _______________
(a) Participant is Sitting__________ Standing________ Activity____ __________ Walking_________ Singing_________ Conversing_ _____ Self Talk________
(b) Participant interacts with another resident. ______________
(c) Participant interacts with a caregiver or staff. ______________
(d) Participant appears to be dozing. ____________________

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Date and Time:______________________________
Recorder:__________________________________
Set One
Participant (4) _______________
(a) Participant is Sitting___________ Standing_________ Activity_____ ___________ Walking__________ Singing_________ Conversing_ ______ Self Talk_________
(b) Participant interacts with another resident. ________________
(c) Participant interacts with a caregiver or staff. ________________
(d) Participant appears to be dozing. __________________________
Set Two
Participant (1)_______________
(a) Participant is Sitting___________ Standing_________ Activity_____ ___________ Walking__________ Singing_________ Conversing_ ______ Self Talk_________
(b) Participant interacts with another resident. ________________
(c) Participant interacts with a caregiver or staff. ________________
(d) Participant appears to be dozing. __________________________
Set Two
Participant (2) _______________
(a) Participant is Sitting___________ Standing_________ Activity_____ ___________ Walking__________ Singing_________ Conversing_ ______ Self Talk_________
(b) Participant interacts with another resident. ________________
(c) Participant interacts with a caregiver or staff. ________________
(d) Participant appears to be dozing. __________________________

Date and Time:______________________________
Recorder:__________________________________
Set Two
Participant (3) _______________
(a) Participant is Sitting___________ Standing_________ Activity____ ___________ Walking_________ Singing_________ Conversing_ ______ Self Talk_________
(b) Participant interacts with another resident. ________________
(c) Participant interacts with a caregiver or staff. ________________
(d) Participant appears to be dozing. ________________________
Set Two
Participant (4) _______________
(a) Participant is Sitting___________ Standing_________ Activity____ ___________ Walking_________ Singing_________ Conversing_ ______ Self Talk_________
(b) Participant interacts with another resident. ________________
(c) Participant interacts with a caregiver or staff. ________________
(d) Participant appears to be dozing. ________________________
Set Three
Participant (1)_______________
(a) Participant is Sitting___________ Standing_________ Activity____ ___________ Walking_________ Singing_________ Conversing_ ______ Self Talk_________
(b) Participant interacts with another resident. ________________
(c) Participant interacts with a caregiver or staff. ________________
(d) Participant appears to be dozing. ________________________

Date and Time:______________________________
Recorder:__________________________________
Set Three
Participant (2) _______________
(a) Participant is Sitting___________ Standing_________ Activity____ ___________ Walking_________ Singing_________ Conversing_ ______ Self Talk_________
(b) Participant interacts with another resident. ___________________
(c) Participant interacts with a caregiver or staff. _________________
(d) Participant appears to be dozing. __________________________
Set Three
Participant (3) _______________
(a) Participant is Sitting___________ Standing_________ Activity____ ___________ Walking_________ Singing_________ Conversing_ ______ Self Talk_________
(b) Participant interacts with another resident. ___________________
(c) Participant interacts with a caregiver or staff. _________________
(d) Participant appears to be dozing. __________________________
Set Three
Participant (4) _______________
(a) Participant is Sitting___________ Standing_________ Activity____ ___________ Walking_________ Singing_________ Conversing_ ______ Self Talk_________
(b) Participant interacts with another resident. ___________________
(c) Participant interacts with a caregiver or staff. _________________
(d) Participant appears to be dozing. __________________________

Date and Time:________________________________
Recorder:_____________________________________
Set Four
Participant (1)________________

(a) Participant is Sitting____________ Standing_________ Activity____ ___________ Walking_________ Singing__________ Conversing_ ______ Self Talk_________

(b) Participant interacts with another resident. ____________________

(c) Participant interacts with a caregiver or staff. __________________

(d) Participant appears to be dozing. ____________________________

Set Four
Participant (2) ________________

(a) Participant is Sitting____________ Standing_________ Activity____ ___________ Walking_________ Singing__________ Conversing_ ______ Self Talk_________

(b) Participant interacts with another resident. ____________________

(c) Participant interacts with a caregiver or staff. __________________

(d) Participant appears to be dozing. ____________________________

Set Four
Participant (3) ________________

(a) Participant is Sitting____________ Standing_________ Activity____ ___________ Walking_________ Singing__________ Conversing_ ______ Self Talk_________

(b) Participant interacts with another resident. ____________________

(c) Participant interacts with a caregiver or staff. __________________

(d) Participant appears to be dozing. ____________________________

Elaine A. Pelletier–Dance movement therapy for persons with dementia.

Date and Time:______________________________
Recorder:__________________________________
Set Four
Participant (4) _______________
(a) Participant is Sitting__________ Standing_________ Activity____ __________ Walking_________ Singing_________ Conversing_ _____ Self Talk________
(b) Participant interacts with another resident. __________________
(c) Participant interacts with a caregiver or staff. ________________
(d) Participant appears to be dozing. __________________________
Set Five
Participant (1)_______________
(a) Participant is Sitting__________ Standing_________ Activity____ __________ Walking_________ Singing_________ Conversing_ _____ Self Talk________
(b) Participant interacts with another resident. __________________
(c) Participant interacts with a caregiver or staff. ________________
(d) Participant appears to be dozing. __________________________
Set Five
Participant (2) _______________
(a) Participant is Sitting__________ Standing_________ Activity____ __________ Walking_________ Singing_________ Conversing_ _____ Self Talk________
(b) Participant interacts with another resident. __________________
(c) Participant interacts with a caregiver or staff. ________________
(d) Participant appears to be dozing. __________________________

Elaine A. Pelletier–Dance movement therapy for persons with dementia.

Date and Time:______________________________
Recorder:__________________________________
Set Five
Participant (3) _______________
(a) Participant is Sitting___________ Standing_________ Activity____ ___________ Walking_________ Singing__________ Conversing_ ______ Self Talk________
(b) Participant interacts with another resident. ___________________
(c) Participant interacts with a caregiver or staff. _________________
(d) Participant appears to be dozing. ___________________________
Set Five
Participant (4) _______________
(a) Participant is Sitting___________ Standing_________ Activity____ ___________ Walking_________ Singing__________ Conversing_ ______ Self Talk________
(b) Participant interacts with another resident. ___________________
(c) Participant interacts with a caregiver or staff. _________________
(d) Participant appears to be dozing. ________________

Appendix G

Original DMT Session Plan

Dance Movement Therapy for Persons with DAT Session Plan

1. ***Introductions and Greetings:*** Group gathers and is seated in armed chairs arranged in a circle.
2. ***Opening: Focus on Repetition:*** These sequences are repeated many times. If the group shows a degree of comfort with the sequence an advanced variation may be added onto the initial sequence. The initial sequence is always done first and makes up the larger portion of each section. *The goal of this section is to establish a range of movement qualities (different weights, time, flow), with many body parts, into various planes (longitudinal, horizontal, and coronal), and at different levels into space (high medium, low).* A wide range of movement qualities is considered similar to wide verbal vocabulary.

Breathing: All participants are seated. Beginning with hands in lap, palms up we lift our palms toward our heads while breathing in. At the top of the breath we turn our palms down and push our hands down and out toward our knees (out breath). This is repeated. *The objective of this coordinated breath and movement is to awaken our bodies and minds to be able to engage in the dance session, as well as to develop the awareness of the other bodies in motion around us.*

Advanced variation: Sequence is repeated with the a gradually widening and progressing upward until the movement is initiated from chest level to above the head where arms and palms turn downward and stretch out to the sides, returning to our laps.

Seated Warm-up:

Hand and Arm Stretch: All participants are seated. We reach our right arms, palms up out in front of our bodies at slightly below chest level. Then we turn our palms down and return our arms and hands to our bodies (staying within the same level). We rest this arm in our laps as we repeat the sequence with our left arms. *The objective is to* *explore generally some movement qualities and to begin specifically to explore reaching beyond ourselves (to those across the circle).*

Advanced variations: (a) The sequence is repeated with our hands held is varying positions (i.e., closed fists, open fingers, palms or back of our hands pushing through the longitudinal plane) (b) After reaching toward the front we reach in the horizontal plane to the side of our bodies, then in the coronal plane until our arms are overhead, and then in the longitudinal plane in front of our bodies. (c) We do the original sequence but alternating our arms without the moment of rest (i.e., one arm reaches out while the other is returning to the chest). (d) Where our wrists circle (singly, in unison, or alternately) as we raise our arm up in front of our bodies and back down to our laps.

Foot and Leg Stretch: All participants are seated slightly forward in their chairs to facilitate movement in the hips. Some participants may choose to hold onto the arms of their chairs. We reach our right legs placing our heels on the floor straight in front of us. We return our feet toward our bodies and repeat with our left legs. *The objective is to bring our awareness into the lower parts of our bodies, and to the floor, and then to connect this awareness to the upper parts of our bodies.*

Advanced variations: (a) Our heels are placed to about a 45-degree angle from our bodies' centerline. (b) Using the original sequence we add our same side (ipsilateral) arm. This arm movement is the same one used in Hand and Arm Stretch. (c) Using the original sequence we add our opposite side (contralateral) arm with the Hand and Arm Stretch sequence.

Knee Lift and Leg Stretch: All participants are seated back into their chairs again to provide support. We gently wrap our hands under our right thighs near our right knees. We draw our right knees toward our chests and then straighten our right legs comfortably. We bend our right knees again returning our legs to the starting position. We repeat by alternating legs. *The objective is to bring our awareness into the lower parts of our bodies and to connect this awareness to the upper parts of our bodies through the initiating of a strong or a sudden action near the center of our bodies.*

Advanced variations: When we first lift our right legs we cross them over the knees of the left legs. Then we kick out our right leg from our knees returning our right feet to the floor. Repeated by alternating legs.

3. ***Theme Exploration: Focus on Rhythm:*** These sequences also receive repetition although the focus is on the rhythm of the sequence and the rhythmical transition between sequences. *The goal of this section is to establish a flowing rhythm with our whole body, which will enhance the awareness of our bodies in space.*

Standing Whole Body Movement: The swinging sequence involves us taking a shoulder or wider stance. From this position we swing our arms (in unison) from side to side in front of our bodies. *The objective is to experience the movement of our bodily weight in space by shifting our weight from one foot to the other with the rhythm.* The twisting sequence involves a transition from the swinging sequence to a movement where we wrap our arms around our torso as we twist from side to side. Continuing the established rhythm, as well as the weight shifting, *the objective of this sequence is to increase range of motion of the head and torso thereby expanding the visual field of the space around us.* The reaching sequence involves stretching our arms in a three-part pattern. While maintaining the rhythm and weight shifting, we stretch our arms upwards along our bodies, downwards with a lean to our sides (both in the coronal plane); and then through the horizontal plane at chest level we stretch our arms to the contralateral side of our bodies. We repeat this alternating the pattern from right to left. *The objective is to provide a transition from whole body rhythm to a rhythm of patterned coordination of body parts moving in space.*

Partnered Dance Steps: Each of next sequences is done with a partner (either with the D/M therapist or one of the other resident participants). Occasionally this is an opportunity for turn taking with the D/M therapist while other participants have a short rest.

Side to side: Holding hands and facing each other the partners step right and then back to the left. This progresses to more consecutive steps to the right then to the left.

Crossing step: The cross step is a continuation of the side step but the step to the right is followed but crossing the left foot to the right of the right foot (crossing over the right foot). Weight is then transferred to the left foot allowing the right foot to return to the initial stance. This is repeated while moving toward the right. Upon reaching a comfortable distance the sequence is repeated moving toward the left, thus crossing the right foot in front of the left. The entire sequence can be repeated by crossing behind. A further variation is to cross first in front and then behind (vine step) with the left foot while moving to the right and with the right while moving to the left.

Turning: Rotating our bodies in space varies in difficulty for persons with dementia. Some will accomplish this without assistance while others will need assistance. The method for this assistance is to use hand, shoulder, and back bodily cues to orient the person to the direction of turning. Thus the D/M therapist begins by facing the person and holding hands with him or her. We practice shifting to a shoulder-to-shoulder stance while letting go of the open side hands. This progresses to a back-to-back stance (maintaining back and shoulder contact) while letting go of the held hands and reaching to grasp with the open hands. The turning movement continues as we turn toward the grasped hands, returning to the initial position. Repeat in the opposite direction. *The objective is to coordinate a pattern of movement with bodily sensation, and visual motion in space toward a transition of the perception of the bodily self-moving in space.*

4. ***Theme Exploration: Focus on Awareness:*** These sequences involve more individualized repetitions; requiring an effort to hold the movement briefly in memory (although this ability varies and assistance is continual if needed). Additionally this section encourages individual expression and the opportunity for creative thought and movement. *The goal of this section is to enhance self-perception both as a body/mind moving through space and as a part of the group-space, group-mind.*

Circle: About this time most participants are ready for a rest. Thus we often return to the chairs and sit down in our circle.

Passing Movement: The D/M therapist will verbally explain as she demonstrates the next sequence. Three different short movements are used in this sequence. Looking to her right the therapist demonstrates a rolling of one hand over the other repetitively, then passes her right hand to the person to her right, asking this person to repeat the movement and pass it on to the person to her own right. With some assistance this movement will go from person to person around the circle and back to the therapist. At this point the therapist repeats the same movement and repeats the sequence to the left. When the movement returns to the therapist changes to a new movement and repeats the sequence; and the sequence is again repeated a third time. For the second movement the therapist slaps her thighs with her hands and then claps her hands together. For the third movement she holds her open palm out in front of her chest and with a slight lifting movement places her palms together while slightly bowing her head. *The objective of this sequence is to challenge memory and focus awareness on the individual movement of self and others.*

Group Movement: At this point participants are often ready to stand-up again. We may move our circle elsewhere, or simply move the chairs back to give us more room. This group movement in a circle builds upon many of the stretching and stepping done to this point. Specific movement are not always followed as the therapist is open to cues from the group; using bodily and visual sensitivity to respond to their movement qualities. *The objective is to reinforce the movement qualities that have been stimulated or retained to allow for further expressive development.*

Creative Movement Expression: This provides the participants with a truly challenging experience. Within the circle the therapist will take a specific posture (determined by the nature of the session) and suggest to one participant to copy the posture. Then the therapist offers clues to how the participant might change the posture through some sort of movement. Clues are not always necessary; this depends on the person. All group participants are then encouraged to copy the person's movement response. The posture and movement request sequence is then repeated with the next person. Depending on the time this part takes we may put these movement together after each person has had a turn creating. *The objective is to bring body and mind together and share this as a movement creation with the group.*

5. ***Closing: Focus on Interdependence:*** In this section we reorganize into a standing circle to move once again as a group in unison. *The goal of this section is to allow participants the opportunity to engage in a group unity while maintaining the developed bodily self-perceptions.*

Group Oriented Movement: This sequence can be adapted to sitting if necessary (as all sequences can). This sequence promotes a common movement quality in all participants. We reach into the circle toward each other (slightly above shoulder level) as we take one step (right foot) into the circle. We then shift our weight back onto our left feet, we draw our arms into our bodies giving ourselves a hug. We repeat this many times. Then we hold hands as we side step around the circle in one direction, and then the other direction. We repeat with a reach into the circle, and up to above our heads, open our arms to our sides. And repeat as needed. *The objective is to leave the participants with a successful, calming exchange.*

6. ***Discussion and Farewells:*** The participants often like to help return the room to proper order. During this time we chat and thank each other for the experience. At this time some participants become emotional or affectionate; all generally continue to 'hang around'.

Appendix H

Revised DMT Session Plan

Dance Movement Therapy for Persons with DAT Session Plan

1. Introductions and Greetings: Group gathers and is seated in armed chairs arranged in a circle.

2. Opening: Focus on Repetition: These sequences are repeated many times. If the group shows a degree of comfort with the sequence an advanced variation may be added onto the initial sequence. The initial sequence is always done first and makes up the larger portion of each section. *The goal of this section is to establish a range of movement qualities (different weights, time, flow), with many body parts, into various planes (longitudinal, horizontal, and coronal), and at different levels into space (high medium, low).* A wide range of movement qualities is considered similar to wide verbal vocabulary.

Breathing*:* All participants are seated. Beginning with hands in lap, palms up we lift our palms toward our heads while breathing in. At the top of the breath we turn our palms down and push our hands down and out toward our knees (out breath). This is repeated. *The objective of this coordinated breath and movement is to awaken our bodies and minds to be able to engage in the dance session, as well as to develop the awareness of the other bodies in motion around us.*

Advanced variation: Sequence is repeated with the a gradually widening and progressing upward until the movement is initiated from chest level to above the head where arms and palms turn downward and stretch out to the sides, returning to our laps.

Seated Warm-up:

Hand and Arm Stretch: All participants are seated. We reach our right arms, palms up out in front of our bodies at slightly below chest level. Then we turn our palms down and return our arms and hands to our bodies (staying within the same level). We rest this arm in our laps as we repeat the sequence with our left arms. *The objective is to explore generally some movement qualities and to begin specifically to explore reaching beyond ourselves (to those across the circle).*

Advanced variations: (a) The sequence is repeated with our hands held is varying positions (i.e., closed fists, open fingers, palms or back of our hands pushing through the longitudinal plane) (b) After reaching toward the front we reach in the horizontal plane to the side of our bodies, then in the coronal plane until our arms are overhead, and then in the longitudinal plane in front of our bodies. (c) We do the original sequence but alternating our arms without the moment of rest (i.e., one arm reaches out while the other is returning to the chest). (d) Where our wrists circle (singly, in unison, or alternately) as we raise our arm up in front of our bodies and back down to our laps.

Foot and Leg Stretch: All participants are seated slightly forward in their chairs to facilitate movement in the hips. Some participants may choose to hold onto the arms of their chairs. We reach our right legs placing our heels on the floor straight in front of us. We return our feet toward our bodies and repeat with our left legs. *The objective is to bring our awareness into the lower parts of our bodies, and to the floor, and then to connect this awareness to the upper parts of our bodies.*

Advanced variations: (a) Our heels are placed to about a 45-degree angle from our bodies' centerline. (b) Using the original sequence we add our same side (ipsilateral) arm. This arm movement is the same one used in Hand and Arm Stretch. (c) Using the original sequence we add our opposite side (contralateral) arm with the Hand and Arm Stretch sequence.

Knee Lift and Leg Stretch: All participants are seated back into their chairs again to provide support. We gently wrap our hands under our right thighs near our right knees. We draw our right knees toward our chests and then straighten our right legs comfortably. We bend our right knees again returning our legs to the starting position. We repeat by alternating legs. *The objective is to bring our awareness into the lower parts of our bodies and to connect this awareness to the upper parts of our bodies through the initiating of a strong or a sudden action near the center of our bodies.*

Advanced variations: When we first lift our right legs we cross them over the knees of the left legs. Then we kick out our right leg from our knees returning our right feet to the floor. Repeated by alternating legs.

3. Theme Exploration: Focus on Rhythm: These sequences also receive repetition although the focus is on the rhythm of the sequence and the rhythmical transition between sequences. *The goal of this section is to establish a flowing rhythm with our whole body, which will enhance the awareness of our bodies in space.*

Standing Whole Body Movement: The swinging sequence involves us taking a shoulder or wider stance. From this position we swing our arms (in unison) from side to side in front of our bodies. *The objective is to experience the movement of our bodily weight in space by shifting our weight from one foot to the other with the rhythm.* The twisting sequence involves a transition from the swinging sequence to a movement where we wrap our arms around our torso as we twist from side to side. Continuing the established rhythm, as well as the weight shifting, *the objective of this* *sequence is to increase range of motion of the head and torso thereby expanding the visual field of the space around us.* The reaching sequence involves stretching our arms in a three-part pattern. While maintaining the rhythm and weight shifting, we stretch our arms upwards along our bodies, downwards with a lean to our sides (both in the coronal plane); and then through the horizontal plane at chest level we stretch our arms to the contralateral side of our bodies. We repeat this alternating the pattern from right to left. *The objective is to provide a transition from whole body rhythm to a rhythm of patterned coordination of body parts moving in space.*

Partnered Dance Steps: Each of the next sequences focuses on footwork while maintaining awareness of both one's own and one's partner's body.

Side to side: Holding hands and facing each other the partners step right and then back to the left. This progresses to more consecutive steps to the right then to the left.

Crossing step: The cross step is a continuation of the side step but the step to the right is followed but crossing the left foot to the right of the right foot (crossing over the right foot). Weight is then transferred to the left foot allowing the right foot to return to the initial stance. This is repeated while moving toward the right. Upon reaching a comfortable distance the sequence is repeated moving toward the left, thus crossing the right foot in front of the left. The entire sequence can be repeated by crossing behind. A further variation is to cross first in front and then behind (vine step) with the left foot while moving to the right and with the right while moving to the left.

Turning: Rotating our bodies in space varies in difficulty for persons with dementia. Some will accomplish this without assistance while others will need assistance. The method for this assistance is to use hand, shoulder, and back bodily cues to orient the person to the direction of turning. Thus the D/M therapist begins by facing the person and holding hands with him or her. We practice shifting to a shoulder-to-shoulder stance while letting go of the open side hands. This progresses to a back-to-back stance (maintaining back and shoulder contact) while letting go of the held hands and reaching to grasp with the open hands. The turning movement continues as we turn toward the grasped hands, returning to the initial position. Repeat in the opposite direction. *The objective is to coordinate a pattern of movement with bodily sensation, and visual motion in space toward a transition of the perception of the bodily self-moving in space.*

4. Theme Exploration: Focus on Awareness: These sequences involve more individualized repetitions; requiring an effort to hold the movement briefly in memory (although this ability varies and assistance is continual if needed). Additionally this section encourages individual expression and the opportunity for creative thought and movement. *The goal of this section is to enhance self-perception both as a body/mind moving through space and as a part of an interactive-space, interactive-mind.*

Interactive Movement: At this point the participant is often ready to stand-up again. This interactive movement builds upon many of the stretching and stepping done to this point. Specific movement are not always followed as the therapist is open to cues from the participant; using bodily and visual sensitivity to respond to his or her movement qualities. *The objective is to* *reinforce the movement qualities that have been stimulated or retained to allow for further expressive development.*

Creative Movement Expression: This provides the participant with a truly challenging experience. The therapist will take a specific posture (determined by the nature of the session) and suggest to the participant to copy the posture. Then the therapist offers clues to how the participant might change the posture through some sort of movement. Clues are not always necessary; this depends on the person. Depending on the time and the participant we may put these many such movements together. We then may 'practice' the created dance piece. *The objective is to bring body and mind together and share this as a movement creation with the participant.*

5. Closing: Focus on Interdependence: In this section we stand or sit facing each other. *The goal of this section is to allow participant the opportunity to engage in a quiet unity that helps to maintaining the developed bodily self-perceptions.*

Group Oriented Movement: This sequence can be adapted to sitting if necessary (as all sequences can). This sequence promotes a common movement quality in the participant and therapist. We reach in toward each other (slightly above shoulder level) as we take one step (right foot) into our 'circle'. We then shift our weight back onto our left feet; we draw our arms into our bodies giving ourselves a hug. We repeat this many times. Then we hold hands as we side step around the 'circle' in one direction, and then the other direction. We repeat with a reach into the 'circle', and up to above our heads, open our arms to our sides. And repeat as needed. *The objective is to leave the participants with a successful, calming exchange.*

6. Discussion and Farewells: The participants often need a period of time to adjust to the end of the session. During this time we chat and thank each other for the experience. At this time the participant may become emotional or affectionate; all generally continue to 'hang around'.

Appendix I

Variation of the Positive Response Schedule

Positive Response Schedule

Observer......... ....

Date................ ....

Intervention..... ....

Phase..........................

Deliberate body movement	
Deliberate head movement	
Vocalization	
Looks at environment	
Looks at carer	
Initiates interaction	
Engagement	
Happy	
Sad	
Fear	

Deliberate body movement	
Deliberate head movement	
Vocalization	
Looks at environment	
Looks at carer	
Initiates interaction	
Engagement	
Happy	
Sad	
Fear	

Deliberate body movement	
Deliberate head movement	
Vocalization	
Looks at environment	
Looks at carer	
Initiates interaction	
Engagement	
Happy	
Sad	
Fear	

Appendix J

Participant Social Validity Questionnaire

Social Validity Questionnaire for Dance Movement Participants

Participant's pseudonym________________________________

Date of questionnaire______________________________________

Phase________________ Session____________________

Questioned by____

1. Did you enjoy this dance movement time with me?
   Response:

2. What did you enjoy (or not enjoy) about doing this dancing?
   Response:

3. Can you tell me why you did (or did not) enjoy this time you spent dancing?
   Response:

Appendix K

PRS Raw Scores

Bev

Positive Response Data

PHASE A	09-May AM	10-May AM	11-May AM	14-May AM	16-May AM	17-May PM	23-May AM	**Mean**
DBM	29	25	30	30	28	30	30	28.85714
DHM	30	30	30	28	30	30	30	29.71429
VOC	19	9	15	8	15	14	11	13
LE	30	30	25	24	27	17	30	26.14286
LC	0	4	7	0	7	9	7	4.857143
II	2	0	4	5	4	7	0	3.142857
ENG	21	13	14	4	11	25	6	13.42857
HAP	9	4	4	0	4	3	5	4.142857
SAD	0	0	0	0	0	0	0	0
FEA	0	0	0	0	0	0	0	0
OVERALL	47	38	43	33	42	45	40	41.14286
ACTION	72	65	71	60	71	67	72	68.28571
AROUSAL	21	11	15	6	13	23	7.3	13.75714
IntObAg	0.85	0.87	0.8	0.84	0.78	0.76	0.94	0.834286

PHASE B	02-Jun AM	06-Jun AM	07-Jun PM	08-Jun AM	**Mean**
DBM	30	30	30	30	30
DHM	30	30	30	30	30
VOC	19	24	23	28	23.5
LE	12	26	22	11	17.75
LC	26	27	22	30	26.25
II	11	15	15	10	12.75
ENG	30	30	30	30	30
HAP	13	12	19	21	16.25
SAD	0	0	3	0	0.75
FEA	0	0	0	0	0
OVERALL	57	65	65	63	62.5
ACTION	78	91	85	86	85
AROUSAL	36	38	45	41	40
IntObAg	0.74	0.78	0.79		0.77

PRS Raw Scores

Bev

PHASE A-2	11-Jun AM	12-Jun AM	13-Jun AM	14-Jun PM	Mean
DBM	30	30	30	27	29.25
DHM	30	30	30	30	30
VOC	11	15	8	7	10.25
LE	30	30	30	12	25.5
LC	0	20	3	2	6.25
II	2	3	2	1	2
ENG	7	18	3	8	9
HAP	3	10	1	0	3.5
SAD	0	0	0	0	0
FEA	0	0	0	0	0
OVERALL	38	52	36	29	38.75
ACTION	67	83	67	52	67.25
AROUSAL	8	21	4	8	10.25
IntObAg	0.94	0.82	0.96	0.82	0.885
PHASE B-2	**18-Jun AM**	**19-Jun* PM**	**20-Jun AM**	**21-Jun PM**	**Mean**
DBM	30	12	30	30	25.5
DHM	30	12	30	30	25.5
VOC	14	1	11	26	13
LE	13	0	9	24	11.5
LC	26	0	29	30	21.25
II	9	0	2	16	6.75
ENG	28	1	26	30	21.25
HAP	1	0	1	12	3.5
SAD	0	0	0	0	0
FEA	0	0	0	0	0
OVERALL	50	9	46	66	42.75
ACTION	75	17	73	93	64.5
AROUSAL	25	1	19	39	21
Overall mean of 3 days			Excepting*		54
IntObAg	0.81			0.77	0.79

PRS Raw Scores

Cassie

Positive Response Data

PHASE A	09-May AM	10-May AM	11-May AM	14-May AM	16-May AM	17-May PM	23-May AM	**Mean**
DBM	21	26	24	30	30	27	23	25.85714
DHM	23	28	27	30	30	26	23	26.71429
VOC	17	21	19	19	21	7	9	16.14286
LE	23	28	27	17	8	7	16	18
LC	6	16	9	10	6	3	10	8.571429
II	7	5	7	2	7	1	1	4.285714
ENG	15	17	11	25	28	16	8	17.14286
HAP	1	4	0	1	2	8	0	2.285714
SAD	0	0	0	0	0	0	0	0
FEA	0	0	0	0	0	0	0	0
OVERALL	38	48	41	45	44	32	30	39.71429
ACTION	60	79	71	71	63	47	54	63.57143
AROUSAL	14	17	12	19	25	17	6	15.71429
IntObAg	0.8	0.81	0.82	0.87	0.88	0.76	0.9	0.834286

PHASE B	05-Jun AM	06-Jun AM	07-Jun PM	08-Jun AM	**Mean**
DBM	30	30	30	30	30
DHM	30	30	30	30	30
VOC	9	20	27	30	21.5
LE	4	2	1	30	9.25
LC	30	30	30	24	28.5
II	1	3	6	1	2.75
ENG	30	30	30	0	22.5
HAP	3	12	15	0	7.5
SAD	0	0	0	0	0
FEA	0	0	0	0	0
OVERALL	46	52	56	48	50.5
ACTION	69	75	79	96	79.75
AROUSAL	23	30	34	0.7 **	21.925
IntObAg		0.9	0.9	0.95	0.916667

PRS Raw Scores

Cassie

PHASE A-2	11-Jun AM	12-Jun AM	13-Jun AM	14-Jun PM	Mean
DBM	19	24	25	18	21.5
DHM	18	24	25	30	24.25
VOC	11	6	19	12	12
LE	19	0	14	11	11
LC	7	16	19	2	11
II	1	0	4	3	2
ENG	9	22	19	20	17.5
HAP	1	2	1	6	2.5
SAD	0	0	0	0	0
FEA	0	0	0	0	0
OVERALL	28	31	42	34	33.75
ACTION	49	47	68	49	53.25
AROUSAL	7.3	16	16	19	14.575
IntObAg	0.85	0.92	0.86	0.8	0.8575

PHASE B-2	18-Jun AM	19-Jun PM	20-Jun AM	21-Jun PM	Mean
DBM	30	30	30	30	30
DHM	30	30	30	30	30
VOC	20	17	19	20	19
LE	20	6	1	1	7
LC	30	30	30	30	30
II	4	4	3	7	4.5
ENG	30	30	30	30	30
HAP	3	3	6	12	6
SAD	0	0	0	0	0
FEA	0	0	0	0	0
OVERALL	56	50	50	53	52.25
ACTION	87	75	73	74	77.25
AROUSAL	25	25	26	33	27.25
IntObAg	0.81	0.86	0.93		0.866667

PRS Raw Scores

Rhonda

Positive Response Data

PHASE A	09-May AM	10-May AM	11-May AM	14-May AM	16-May AM	17-May PM	23-May AM	**Mean**
DBM	28	28	30	30	30	30	29	29.28571
DHM	30	30	30	28	30	30	30	29.71429
VOC	19	14	17	12	14	22	22	17.14286
LE	11	23	9	16	8	8	21	13.71429
LC	17	13	15	4	5	14	24	13.14286
II	4	5	3	6	7	6	5	5.142857
ENG	27	20	29	27	26	30	25	26.28571
HAP	4	1	5	3	2	6	3	3.428571
SAD	0	0	0	0	0	0	0	0
FEA	0	0	0	0	0	0	0	0
OVERALL	47	45	46	42	41	49	53	46.14286
ACTION	70	72	67	60	58	69	84	68.57143
AROUSAL	23	17	25	24	23	28	22	23.14286
IntObAg	0.71	0.82	0.92	0.84	0.85	0.83	0.77	0.82

PHASE B	31-May PM	02-Jun AM	06-Jun AM	08-Jun AM	**Mean**
DBM	30	30	28	30	29.5
DHM	30	30	27	30	29.25
VOC	19	19	15	27	20
LE	3	9	1	5	4.5
LC	30	30	28	30	29.5
II	7	11	11	9	9.5
ENG	30	30	28	30	29.5
HAP	0	1	3	12	4
SAD	0	0	0	0	0
FEA	0	0	0	0	0
OVERALL	50	53	47	58	52
ACTION	75	79	66	81	75.25
AROUSAL	25	28	28	34	28.75
			***		
IntObAg	0.88	0.85	0.87		0.866667

PRS Raw Scores

Rhonda

PHASE A-2	11-Jun AM	12-Jun AM	13-Jun AM	14-Jun PM	Mean
DBM	30	30	28	30	29.5
DHM	30	30	28	30	29.5
VOC	8	16	5	13	10.5
LE	8	18	9	6	10.25
LC	1	28	3	3	8.75
II	3	1	4	3	2.75
ENG	30	27	27	29	28.25
HAP	0	0	0	1	0.25
SAD	0	0	0	0	0
FEA	0	0	0	0	0
OVERALL	37	50	35	38	40
ACTION	51	81	49	55	59
AROUSAL	22	19	21	22	21
IntObAg	0.94	0.83	0.95	0.9	0.905

PHASE B-2	18-Jun AM	19-Jun PM	20-Jun AM	Mean
DBM	30	30	30	30
DHM	30	30	30	30
VOC	21	26	30	25.66667
LE	11	9	4	8
LC	30	30	30	30
II	6	5	6	5.666667
ENG	30	30	30	30
HAP	4	0	0	1.333333
SAD	0	0	0	0
FEA	0	0	0	0
OVERALL	54	53	53	53.33333
ACTION	81	83	83	82.33333
AROUSAL	27	23	24	24.66667
IntObAg	0.89	0.92	0.96	0.923333

PRS Raw Scores

Patrick

Positive Response Data

PHASE A	09-May AM	10-May AM	11-May AM	14-May AM	16-May AM	17-May PM	23-May AM	**Mean**
DBM	30	18	29	24	24	29	30	26.28571
DHM	30	30	30	30	30	30	29	29.85714
VOC	30	27	27	28	30	28	29	28.42857
LE	30	28	23	30	27	23	29	27.14286
LC	10	8	6	11	0	10	3	6.857143
II	0	1	3	4	0	3	1	1.714286
ENG	30	30	30	28	24	30	30	28.85714
HAP	0	0	0	0	5	0	0	0.714286
SAD	0	0	0	0	0	0	0	0
FEA	0	0	0	0	0	0	0	0
OVERALL	54	47	49	52	47	51	50	50
ACTION	87	74	77	82	74	80	80	79.14286
AROUSAL	21	21	22	21	19	22	21	21
IntObAg	0.95	0.81	0.93	0.84	0.82	0.91	0.94	0.885714

PHASE B	02-Jun AM	06-Jun AM	07-Jun PM	08-Jun AM	**Mean**
DBM	30	30	30	30	30
DHM	30	30	30	30	30
VOC	11	9	27	29	19
LE	10	1	13	20	11
LC	28	30	30	30	29.5
II	3	6	7	4	5
ENG	28	30	25	28	27.75
HAP	0	0	6	4	2.5
SAD	0	0	0	0	0
FEA	0	0	0	0	0
OVERALL	47	45	56	58	51.5
ACTION	73	67	87	93	80
AROUSAL	21	24	25	24	23.5
IntObAg	0.88	0.95		0.82	0.883333

PRS Raw Scores

Patrick

PHASE A-2	11-Jun AM	12-Jun AM	13-Jun AM	14-Jun PM	Mean
DBM	30	30	30	30	30
DHM	30	30	30	30	30
VOC	28	30	30	30	29.5
LE	30	27	30	30	29.25
LC	2	7	0	0	2.25
II	1	0	0	3	1
ENG	26	30	30	30	29
HAP	0	0	0	0	0
SAD	0	0	0	0	0
FEA	0	0	0	0	0
OVERALL	49	51	50	51	50.25
ACTION	80	83	80	80	80.75
AROUSAL	18	20	20	22	20
IntObAg	0.93	0.97	1	0.97	0.9675

PHASE B-2	18-Jun AM	19-Jun PM	20-Jun AM	21-Jun PM	Mean
DBM	30	30	30	30	30
DHM	30	30	30	30	30
VOC	28	23	30	30	27.75
LE	23	12	13	12	15
LC	28	30	30	30	29.5
II	5	3	3	5	4
ENG	26	29	30	29	28.5
HAP	1	2	0	1	1
SAD	0	0	0	0	0
FEA	0	0	0	0	0
OVERALL	57	53	55	56	55.25
ACTION	93	83	89	88	88.25
AROUSAL	21	23	22	23	22.25
IntObAg		0.93	0.93	0.92	0.926667