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Contents

NOTE: Previously *Behaviorology Today* published occasional fully peer–reviewed articles, explicitly so labeled. Beginning with Volume 15, Number 1, *all* articles receive full peer review. See the "Submission Guidelines" for details.

* This issue does not contain any TIBI course syllabi. New syllabi, or updates of previous syllabi, may appear in future issues. (See the *Syllabus Directory* for details.)

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Editor's Note

Philip R. Johnson

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This issue contains two behaviorological research studies that relate to some traditional clinical concerns. While I served as the action editor as usual for the first paper, I prevailed upon the previous editor, Stephen Ledoux, to wear the hat of action editor for the second paper, because I authored it. As this added to his layout, production, and distribution tasks as managing editor, we extend to him our hearty thanks.

In the first report, John Ferreira discusses his research on a passive cue–controlled progressive relaxation procedure known as *Progressive Neural Emotional Therapy* (PNET). This therapeutic behaviorological intervention "has been used successfully across a wide range of populations varying in diagnoses, gender, age, ethnicity, medical conditions, physical disabilities, and intellectual impairments" (Ferreira, 2012 [this issue] p. 5). PNET is a valuable tool for behaviorological practitioners to use when addressing problems related to functional behaviors and physical health.

In the second report, I discuss my research on examining the effects of PNET on tardive dyskinesia, a movement disorder associated with neuroleptic medications. A multiple–baseline–across–subjects design was used for this study. The severity of the dyskinetic movements manifested by each of the three study participants was observed to improve upon introduction of the PNET treatment protocol.

Lastly, I would like to remind everyone that the TIBI *26th Behaviorology Anniversary Convention* has been scheduled for 28–31 May 2013 in Tucson AZ. Consider this note a prelinimary call for papers, and contact me (pjohnsonphd@gmail.com) with any possibilities for papers, posters, panel discussions, etc. See you there.♣

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Ferreira, J. B. (2012). Progressive Neural Emotional Therapy (PNET): A behaviorological analysis. *Behaviorology Today, 15* (2), 3–10.

Progressive Neural Emotional Therapy (PNET): A Behaviorological Analysis

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Abstract

Stress and anxiety have been intimately associated with countless neuro–emotional dysfunctional behaviors. Recent history suggests that a wide range of techniques used for calming/relaxing individuals have resulted in diverse and inconsistent resolutions. Some of these unsatisfactory outcomes result from a lack of definitive operational descriptors of the relaxation process and deficiencies in standardization. Progressive Neural Emotional Therapy (PNET) provides an objective methodology based on the principles and practices of Behaviorology. PNET minimizes or eliminates anxiety as a response to external and internal stress.

Every real problem can and will be resolved in due course without supernatural divination, entirely by accurate observation and close, searching thought.—Ernst Mach, 1897.

Early one morning, A.B., a middle–aged professional woman, walked into the Center for Behavior Analysis and Counseling (CBAC) seeking help for her "psychiatric disturbances." She was accompanied by her husband who stated emphatically that "they" were doing her no good and, in fact, were destroying her as well as their entire family. She had been repeatedly admitted to a local psychiatric facility where she "seemed to become more anxious" with each admission. She had been referred to CBAC by her attending psychiatrist who informed her that her health insurance had "run out" so her next admission would be to the "dreaded" state psychiatric hospital located more than 100 miles from her home.

During the initial interview A.B. was actively hallucinating as manifested by statements such as "don't you feel the devil standing behind you?" And she could not understand why the interviewer was not bothered by the hellish heat. This continued as she sat across the table red–faced and perspiring. At the end of the interview, bi–weekly PNET sessions were scheduled to begin immediately.

After less than a year of PNET training she and her family returned to life as they had experienced it before the advent of the dysfunctional behaviors. Several years have passed and during this time she has not seen the inside of a psychiatric facility nor has she taken any psychiatric medications.

C.D. is a six–year–old girl who was enrolled in the first grade at a public elementary school. Her mother requested that C.D. be accepted for PNET training at the Biobehavioral Relaxation Clinic (BRC). She related how her daughter had been suspended from school because of her inattentive, disruptive behaviors and, at times, aggressive–destructive outbursts. In addition, her daughter was visually impaired and in need of specialized instruction that was available at a state–sponsored school for children with hearing and visual impairments. Her application for admission to the school had been denied because of her "autistic" behaviors. Despite her mother's objections to labeling her child "autistic," the public school was in the process of evaluating C.D. for possible placement within its special education class. C.D.'s parents were of the opinion that she was a "nervous child" who experienced "lots of stress and anxiety" related to her visual disability.

C.D. gradually responded to PNET sessions at the BRC and within a year was reinstated into her original class at school. By the end of that school year she was

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re–evaluated by the school for the visually impaired and subsequently accepted as a student. Follow–up after a few years showed that she continued to progress at a rate consistent with the other students.

E.F. was a strong, athletic 82–year–old man when he received a diagnosis of "tumor, urothelial carcinoma *in situ*," a medical descriptor for bladder cancer. Tumors identified as carcinoma *in situ* are likely to increase in invasiveness and malignancy, and have been described as treacherous with unpredictable outcomes. During his initial interview at the BRC, he appeared upset as he remarked "Of course the diagnosis was devastating. Here I was an 82–year–old man who listed excellent physical health as the second highest priority in life suddenly the owner of a malignant tumor." It was apparent that he was experiencing considerable stress and, as he put it, "this is a most anxious time for me."

PNET with guided imagery sessions began with some urgency because his oncologist had scheduled a cystectomy in three weeks. It was during this interim that all PNET sessions were conducted. E.F. had successfully completed seven PNET sessions before the pre–surgical evaluation was completed. The second biopsy revealed "no definite evidence of metastatic disease" and that the "bladder appeared normal" (Ferreira, 2009–2010).

As part of the state's deinstitutionalization mandate, G.H., a young man with profound intellectual impairment, was admitted to the BRC. He was described as being "extremely anxious" with several unmanageable behavioral manifestations that included "aggression towards others in the form of biting, slapping, scratching, kicking, and head–butting; self–injurious behaviors of biting his hands/arms, slapping his head/torso, pulling his hair, and forcefully pressing his knuckles into his eyes; disruptive behaviors of non–compliance, screaming, and denudation; and destructive behaviors of damaging furniture, tearing clothing, throwing objects, and breaking windows." His parents were unable to cope with him, and several group homes had refused placement.

After approximately 16 months of PNET sessions with behaviorological counseling, G.H. was able to control most of his maladaptive behaviors when cued with evocative stimuli for relaxing. He was successfully placed in a residential group home.

Those four examples represent cases in which PNET was either the primary intervention strategy or a significant component of a more complex treatment plan. The results achieved in these cases are consistent with the outcomes of the vast majority of individuals seen in the BRC during the last 20 years.

It should also be noted that three of the four individuals mentioned had been receiving psychopharmacological medications prior to and during the initial PNET sessions. Each experienced a significant reduction or discontinuation of these medications by the time the final phase of PNET training was completed. They or members of their families were convinced that these medications were of little to no benefit in remediation or elimination of their dysfunctional conditions. In one case, the prescribed psychotropic drugs were harmful and had contributed to florid manifestations of severe "psychiatric" symptoms.

In addition to the common adverse experiences and outcomes from prescribed behavior–altering medications, there was a more compelling commonality among these individuals that seemed to go unnoticed during clinical assessments made prior to their admission. Regardless of the primary diagnosis, there were two descriptors common to all the clinical profiles. These descriptors were "stress" and "anxiety." It appeared that the neural and hormonal (emotional) interactions in response to evocative internal and external environmental factors seemed to be the basis for most of the problematic manifestations. Attempts to rectify these problems were confounded by the many agential explanations and traditional psychiatric labels. A more reasonable and pragmatic approach toward a resolution of these problems was to identify stress as a multi–faceted evocative stimulus, anxiety as a multi–dimensional response pattern, and the postcedent stimuli as reinforcing and/or punishing consequences. The behaviors of concern are mediated rather than initiated by the individual. Ledoux (2012) elaborated on this concept in a recent article when he unequivocally stated that "Behavior is a natural phenomenon that happens, and changes, because variables affect the particular body structures that mediate it. No mysterious inner self–agent does the behaving or instructs the body to behave." (Ledoux, 2012, p. 60). These principles are amenable to a behaviorological analysis of the reactions of anxiety to internal and external stressors.

Stress was the first descriptor of emotional instability manifested in each of the four cases mentioned. Stress has been used by physicists since the mid–seventeenth century to explain the property of elasticity of malleable material. Robert Hook explained the Law of Elasticity of 1678 as the magnitude of an external force, or stress, that produces a proportional amount of deformation or strain in a material that allows it to resume its original size and shape after having been compressed or stretched by the external force or stress (Gribben, 2004, pp. 159–164). Centuries later, Hans Selye in 1936 defined stress as the non–specific response of the body to any demand for change. However, he eventually concluded that this definition was inadequate and unsuccessfully struggled to find a satisfactory definition of stress (Selye, 1982).

The *Diagnostic and Statistical Manuel of Mental Disorders* (American Psychiatric Association [APA], 2000) defines a psycho–social stressor or stress as "any life event or life change that may be associated temporally (and perhaps causally) with the onset, occurrence, or exacerbation of a mental disorder." This definition completes the degenerative evolution of the meaning of stress from the original objective operational definition that was offered by physicists to the current vernacular in clinical discourse offered by psychiatrists. The medical profession contributes to the further confabulation of stress by defining psychological stress, in *Taber's Cyclopedic Medical Dictionary* (Venes, 2005) as the source of events including "… perceptions, emotions, anxieties, and interpersonal, social, or economic events that are considered threatening to one's physical health, safety or well–being" (p. 2086). "There is no definition of stress that everyone agrees on and, therefore, stress is not a useful term for scientists because it is such a highly subjective phenomenon that it defies definition" (American Institute of Stress, 2012). A valid and comprehensive definition of stress would require broad participation and input from collaborating natural scientists. Advanced technological instrumentation, some not yet invented, would be required to fully explain *how* behaviors occur. This would be compatible with the natural science of human behavior's explanation of *why* behaviors occur. Eventually this collaboration of natural scientists could produce an operational definition of terms such as stress and anxiety.

Anxiety is the other descriptor of emotional instability manifested in each of the aforementioned case studies. In contemporary clinical practice stress, the first descriptor, is often used interchangeably with anxiety when describing or diagnosing maladaptive social behaviors of unknown etiology. This absence of objectivity, lack of clarity, and overlap of meaning makes it difficult to understand, quantify, or use anxiety in any constructive manner. Clinically, anxiety is a catch–all term that is used when describing individuals who engage in mannerisms traditionally referred to as mental disorders and mental illnesses. Despite its many confounding variables and its dominance by mainstream psychology, "anxiety is a suitable subject for behavior–analytic study" (Friman, Hayes, & Wilson, 1998, p. 137). There are many synonyms for anxiety ranging from unease, worry, angst, and distress to neurosis, mentally troubled, depression, and panic.

The use of the term anxiety dates back to the beginning of the twentieth century. Currently it is defined as "The emotional component of biological responses to imagined danger linked to intra–psychic conflict, clinical–physical tachycardia, dyspnea, trembling, cognitive difficulties, hypersensitivity, dizziness, weakness, dysrhythmia, sweating, fatigue, clinical–mental sense of impending doom, powerlessness, apprehension, and tension" (*McGraw–Hill Concise Dictionary of Modern Medicine,* 2002). The most widely used definition for anxiety is found in the *Diagnostic and Statistical Manual of Mental Disorders* (APA, 2000) where anxiety is characterized as the apprehensive anticipation of future danger or misfortune accompanied by a feeling of dysphoria or somatic symptoms of tension; the focus of anticipated danger may be internal or external. There may be some apparent similarities in segments of these definitions of anxiety but, more importantly, there is an obvious need for objectivity in its descriptors before the term anxiety can be operationally defined for experimental and empirical studies oriented towards factual outcomes with predictive and applicative value. However, despite these limitations, behaviorologists must continue to pursue *why* anxiety behaviors occur while the understanding of *how* behaviors occur remains a work in progress for natural scientists in related disciplines.

The principles of Behaviorology can be used to describe the process of how internal and external environmental evocative stimuli impact human sensory systems in such a manner that the body mediates a relaxed homeostatic state. Based on this understanding, a passive cue–controlled progressive relaxation procedure has evolved over the last four decades into a standard method of relaxation training known as Progressive Neural Emotional Therapy, or PNET. This therapeutic technique has been used successfully across a wide range of populations varying in diagnoses, gender, age, ethnicity, medical conditions, physical disabilities, and intellectual impairments (Ferreira, 2010; Johnson, 2012). This paper attempts to explain why effective human behavior is achieved when principles of behaviorology are used to explain the process of PNET.

Progressive Neural Emotional Therapy—PNET

Edmund Jacobson (1938) introduced the concept of progression in relaxation training by describing how an increase in muscle relaxation, as measured by electromyographic instrumentation, is inversely proportional to muscle tension or stress. He suggested that "as relaxation progresses and reflex contractions diminish, there is a consequent diminished production of proprioceptive impulses, tending thus towards a progressive decrease in the production of further reflexes" (p. 296). This is consistent with the use of the term "progressive" in PNET. In addition, the term *progressive* describes how the induction procedure begins with one muscle group (e.g., the hand) and progresses to ascending muscle groups until all muscle groups have been addressed in a systematic fashion. This allows the individual's responses to achieve, incrementally and gradually (progressively) a reduced level of anxiety or, conversely, an increased level of relaxation. Progression also refers to an individual's positively accelerating and verbally described expectations of clinical progress in rectifying the problems of concern.

The neural aspects of PNET concern the central nervous system as it is organized at the gross, cellular, and molecular levels which define the biological substrates of behavior. The behaviorological connection to physiology was recognized when Skinner (1969) pointed out that an analysis of behavior "is essentially a statement of the facts to be explained by studying the nervous system. It tells the physiologist what to look for." (Skinner, 1969, p. 283). Energy from the individual's internal and external environment stimulates the human sensory system and through the peripheral nervous system transmits this bio–energy to the brain. Norden (2007) states that "The brain literally controls every organ in the body and controls everything you see, hear, or feel. It allows you to think. All of these things are a function of the cortex" (Norden, 2007, p. 268). For example, sound energy in the form of vibrating air waves enters the outer ears and is converted into mechanical oscillations in the auditory canal. The hair cells at the end of the internal ear convert these vibrations into electrical signals in the auditory nerves which then energize the neurons of the auditory areas of the brain. It is in these areas that sounds are "heard" (behaved auditorily), which stimulates further neural behaving of the kind called interpretation. The latter neural behavior is said to be the "meaning" of those sounds. This is how meaning is given to words behaved in a form or language pattern (Kelly, 1991). When a speaker says the word "relax," the listener hears this sound and behaves its meaning based on how his/her prior conditioning experiences have impacted his/her genetically inherited neural and emotional (biochemical) structures. Similar environmental–neural–emotional processes exist for the other sensory system inputs.

It is widely acknowledged that human emotions are the end products of neural–biochemical responses and reactions generated by external and internal environmental evocative and eliciting stimuli. Fraley (2008) explains that "Emotional behaviors produce temporary modifications to the body, mostly through chemical means. The temporarily changed body then behaves differently in responding to stimuli. Both motor and verbal behaviors can be affected while the body of the behaving organism is emotionally altered. Such temporary effects on behavior occur because the behaving body is changed by the chemical substances that are released by the emotional behavior of certain body parts (e.g., glands)" (p. 40). Emotion is a basic physiological condition of the body that is characterized by identifiable autonomic or bodily changes. It is a reflection of the effects of evocative stimuli or stressors. These stressors stimulate those areas of the sympathetic nervous system that initiate hormonal releases such as epinephrine and cortisol. These biochemical reactions or emotional responses are useful and non–damaging in the short–term because they increase alertness, muscle preparedness, and other physiological changes that deal with threats and challenges. When the threat or challenge is no longer present, the parasympathetic nervous system returns the physiological response condition to a balanced beneficial homeostatic state.

Chronic or frequent stress evocations (e.g., chronic emotional responses or anxiety) may produce dysfunctional behaviors as well as detrimental effects on the immune and cardiovascular systems. Norden (2007) points out that chronic stress/anxiety can lead to neuron death in the brain. She further states that "Chronically high cortisol levels are associated with a decrease in the immune response, a decrease in DNA repair mechanisms, and an increase in autoimmune mechanisms" (p. 144). The value of stress/anxiety reduction is obvious and suggests the need for PNET, a standard and accessible method for achieving stress/anxiety reduction.

Behaviorology serves as the basic natural science for explaining the PNET process where the relaxation experience is a behaved reaction to restructured environmental stimuli. The individual's behavioral outcome is maintained by produced reinforcers. Fraley (2008) described Behaviorology as "a comprehensive discipline with philosophical, experimental, analytical, and technological components. It is a natural life science of functional relations between behavior and the environment in which that behavior occurs. Behavior is explained as a direct, natural, innervated reaction to environmental events, without any causal contribution by putative behavior–directing agents within the body. The body only mediates the production of behavior. Behavior is always reactive. It cannot be proactive" (p. 36). Stated schematically:

$$S^{Ev} \longrightarrow B \longrightarrow C$$

Here $\mathbf{S^{Ev}}$ represents antecedent evocative stimuli, **B** represents the behavioral reaction evoked by these environmental events, and **C** represents the postcedent stimulus consequences. This formulation provides the determining guidance for the development and implementation of PNET.

There are four phases to the PNET technique: the Preparatory Phase, the Induction Phase, the optional Imagery Phase, and the Transfer Phase.

Preparatory Phase

The Preparatory Phase begins with an initial interview and functional assessment. These are completed to determine whether the individual is a viable candidate for PNET training. During this period the behaviors of interest are identified and defined, outcome expectations are delineated, medical conditions and medications are listed and described, and any other significant contributing factors are documented. In addition, the types, strength, appropriateness, and availability of potential reinforcers are determined.

The training room is an environmentally restructured enclosed space (minimally 100 square feet) where reduced noise levels, dimmed lights, moderate temperatures, clean air, and an interruption–free area is assured for the entire session. Materials include a full–size recliner, a timer such as a stopwatch, a behavior counter, a wheeled therapist chair, a surf–sound generator, and relevant data sheets.

Upon entering the training room the individual is directed to sit in the recliner and to position himself/herself for PNET training. The chair is then reclined to a comfortable level as the therapist positions the therapist's chair to the side of the recliner in close proximity to the surf–sound generator. The individual is instructed to inform the therapist immediately if he/she experiences discomfort at any time during the session. The therapist then offers a brief description of what the individual might experience as the session progresses. After answering any questions the individual may have, he/she is further instructed to "take a few moments" (approximately five seconds) to think of "nothing but relaxing."

Induction Phase

The Induction Phase has ten steps. The optional Imagery Phase comes between Step Five and Step Six.

1. The individual is asked to take three slow deep breaths as demonstrated by the therapist. Each breath is slowly and deeply inhaled through the nostrils, held for approximately three to five seconds, then slowly and gently exhaled through the mouth. After each exhalation, the therapist immediately reinforces the deep breathing by saying "good" in a calm soothing voice.

2. The therapist turns on the surf–sound generator and adjusts the surf rate to six surf sounds per minute (SPM). The surf volume is set at slightly above the just noticeable difference.

3. In a calm, soothing monotone voice, the therapist mands the individual to "let your hands … relax," synchronizing the word "relax" with the crashing sound of the surf. If the individual's hands appear to be relaxing (no movement, limp), the therapist immediately reinforces this response by saying "good" in a calm soothing voice.

4. The therapist repeats Step Three but replaces the word "hands" with one of the following in the order listed: arms, shoulders, forehead, eyes, face, mouth, jaw, neck, upper back, chest, stomach, lower back, legs, feet, and ultimately the entire body. This sequence is repeated at least once.

5. The individual is informed that the therapist will remain silent for approximately two minutes while the surf–sounds continue at six surf SPMs. This will provide an opportunity for the individual to enjoy the neural and emotional sensation of being relaxed. It is further suggested that "all thoughts, ideas, images, and fantasies experienced during this period will enhance the sensation of being relaxed." After approximately two minutes, proceed to the next step.

(Optional: Insert the *Imagery Phase* here, if it is to be used [see next section].)

6. Return to the induction processes of Step Three and Step Four by suggesting that the individual "let your hands" (Step Three) "and your arms" (Step Four) "… relax" followed by "good." Maintain synchronization of the surf–sound, and continue with "let your arms and your shoulders … relax" then onto "let your forehead and your eyes … relax" and continue doubling the muscle groups until the entire body mediates relaxed behavior.

7. In a calm, soothing voice, the therapist informs the individual that the session is coming to an end and he/she should remain comfortable and relaxed.

8. The therapist gradually turns down the volume on the surf–sound generator.

9. The therapist asks the individual to take three slow deep breaths as demonstrated. Each breath is slowly and deeply inhaled through the nostrils then slowly and gently exhaled through the mouth without holding the breath. After each exhalation, the therapist immediately reinforces the deep breathing by saying "good" in a calm and soothing voice.

10. The therapist informs the individual that the session is complete and he/she should remain comfortable and relaxed.

The ten steps of the Induction Phase are followed by the Transfer phase. Before describing the Transfer Phase, here is the optional Imagery Phase.

Imagery Phase (Optional)

The Imagery Phase, though optional, is an integral component of the Induction Phase. Induction Phase mastery is indicated by the individual achieving a greater than 90% relaxation score on the PNET Relaxation Checklist (see Form 1) for a minimum of three consecutive sessions. After the Induction Phase has been mastered, imagery training is introduced between Step Five and Step Six of the Induction Phase. The type of imagery selected (scenic, experiential, emotional, fantasy, or any function–altering pattern of behaviors) must be found acceptable to the individual before beginning this phase. Two or three different imagery scenarios are prepared in advance. The scenario used during a session

Form 1

PNET Relaxation Checklist

Name: ______________________ Date: _____________ Start Time: _________

Rater: ______________________ Pre–Score: __________ Stop Time: __________

Session #: __________________ Post–Score: _________

MUSCLE GROUP		Tense	SCORE			Relaxed
1.	Right Hand	1	2	3	4	5
2.	Right Arm	1	2	3	4	5
3.	Right Shoulder	1	2	3	4	5
4.	Left Hand	1	2	3	4	5
5.	Left Arm	1	2	3	4	5
6.	Left Shoulder	1	2	3	4	5
7.	Forehead	1	2	3	4	5
8.	Eyes	1	2	3	4	5
9.	Face	1	2	3	4	5
10.	Mouth	1	2	3	4	5
11.	Jaw	1	2	3	4	5
12.	Neck	1	2	3	4	5
13.	Upper Back	1	2	3	4	5
14.	Chest	1	2	3	4	5
15.	Abdomen	1	2	3	4	5
16.	Lower Back	1	2	3	4	5
17.	Right Leg	1	2	3	4	5
18.	Right Foot	1	2	3	4	5
19.	Left Leg	1	2	3	4	5
20.	Left Foot	1	2	3	4	5

Total Score Achieved:______

Notes: Relax = loose, limp muscle tone, supported by a subjective verbal report
Tense = rigid, tight muscle tone, supported by a subjective verbal report

Relaxation Score = (Total Score Achieved **/** 100) **x** 100 = _____ **%**

Observations:

depends on the conditioning history of the client and is selected to stimulate sensory input relevant to the designated objectives. For example, an image depicting a beach setting is presented in such a way as to elicit sensations of touch (sand, blanket, water), temperature (cool breeze, warm water, hot sun), taste (salt water, soft drink, ice cream), smell (ocean air, hot dogs on a grill, sunscreen lotion), and visual (sunset, ocean view, people). (See Ferreira & Duncan, 2002, for an example of an included Imagery–Phase that also helped with a medical condition. In this case a client with previous PNET training and with multiple warts on both hands, for which no traditional medical treatment had worked, was rid of his warts after seven PNET sessions over a 12–week period. This study also collected data on hand temperatures during the Imagery Phase, which involved imagining hands in the hot sun; records of measured hand temperatures showed an increase.) After completing the Imagery Phase, proceed to Step Six of the Induction Phase. When that phase finishes, proceed with the Transfer Phase.

Transfer Phase

The individual is given a PNET training CD which is to be used for practicing at home under conditions that closely approximate the clinic training sessions. The Transfer Phase is complete when clinic sessions are no longer required. Eventually the individual's body will respond physiologically to the mand "relax" which will be a competing stimulus to potential anxiety–provoking stimuli or stressors. Behaviorological counseling is provided as needed to assist in the transfer of the acquired relaxation skills across different environments.

Progressive Neural Emotional Therapy, PNET, is a behavioral realignment process that is guided by the principles and practices of Behaviorology. There are four phases (Preparatory, Induction, Imagery, and Transfer) that comprise the implementation of the PNET process. In addition, it provides behaviorological counseling, an objective approach to rectifying dysfunctional behaviors that are internally and externally elicited, a means of minimizing social emotional maladaptive behaviors, and effective strategies and techniques in skill development and education. PNET could have a vast impact on human behavior when applied to areas of functional behaviors and physiological health.

When a thing is new, people say: "It is not true." Later, when its truth becomes obvious, they say: "It's not important." Finally, when its importance cannot be denied, they say: "Anyway, it's not new."—William James.

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Submission Guidelines

Behaviorology Today **is the peer–reviewed Journal of TIBI *(The International Behaviorology Institute)* and is published in the spring and fall of each year.**

To submit items, **contact the Editor, Dr. Philip R. Johnson (University of Arizona, Tucson) at:**
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Considerations

The Journal entertains experimental or applied research papers and theoretical or conceptual or literature review articles (all of which will have at least three reviewers) as well as book reviews, on terms, in response, and program descriptions (two reviewers) plus letters, memorials, etc. The members of the TIBI Board of Directors constitute the basic Editorial Review Board (ERB) on which others can serve as members or guests. Authors will not be identified to reviewers and reviewers will not be identified to authors, except when they opt to sign their reviews. (Some reviewers prefer to sign, usually in acknowledgement of the additional assistance that they are prepared to offer the author.) Each reviewer will provide constructive feedback as well as a recommendation: accept, or accept with revisions, or revise and resubmit, or reject.

Based on the set of reviewer recommendations and comments, the Editor will convey the feedback and summary decision to the author(s). With assistance from members of the ERB, the Editor will also provide authors with guidance to shape the best manuscripts possible in a reasonable time frame.

All accepted pieces must contribute to the behaviorology discipline (e.g., by relating to or clarifying or expanding some part of the discipline such as the philosophical, conceptual, theoretical, experimental, applied, or interdisciplinary aspects). Accepted pieces must also be crafted in ways that convey as much consistency as possible with the principles, concepts, practices, philosophy, and terminology of the discipline.

Research paper authors (a) must obtain any necessary permissions or approvals from the Human Subjects Review Committee of their affiliated campus or agency, and (b) must comply with the usual ethical standards relating to all research and experimental subjects. All authors are required to disclose for publication any possible conflicts of interest.

Congruent with past practice, exclusions of important or relevant content for length reduction will be resisted as much as possible.

Mechanics

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A Behaviorological Approach to Management of Neuroleptic–Induced Tardive Dyskinesia: Progressive Neural Emotional Therapy (PNET)

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Abstract

The effectiveness of Progressive Neural Emotional Therapy (PNET) in decreasing the severity of neuroleptic–induced tardive dyskinesia (TD) was examined in the current study. Three residents at a county–owned nursing home, who had been receiving neuroleptic medications for a number of years to treat various psychiatric disorders, participated in this study. A multiple–baseline–across–subjects design was used to evaluate the effect of PNET on the participant's orofacial TD symptoms. The severity of each participant's orofacial TD was observed to improve when the intervention was introduced. Treatment integrity and interobserver agreement data that were collected indicate that the intervention was implemented at a high level of fidelity and that the data were reliable. Thus, a clear functional relationship was established between PNET and severity of orofacial TD in this study. Although the present study was preliminary in nature, the results that were obtained provide a basis upon which to develop a behaviorological treatment protocol for managing TD.

Somewhat like happiness—which is readily understood until one is asked to define it—the apparently straightforward, causative relationship between neuroleptic treatment and development of tardive dyskinesia unravels under scrutiny.—Gardos & Cole, 1997, p. 113.

Since their introduction in the early 1950s, neuroleptic, or antipsychotic, medications have greatly influenced psychiatric care and treatment (Keltner & Folks, 2005; Rivas–Vazquez, Blais, Rey, & Rivas–Vazquez, 2000). Prior to their use, hundreds of thousands of individuals with severe psychiatric problems were hospitalized, at times under poor conditions (Keltner & Folks, 2001). Physical restraint, social isolation, chemically induced sedation or comatose states or seizures, and occasional treatment with aggressive measures (e.g., psychosurgery, electroshock therapy) were commonly used to control patients before the widespread use of neuroleptic agents (Keltner & Folks, 2001; Minchin & Csernansky, 1996). Persons who were the recipients of these treatments were rarely able to resume productive social or occupational functioning (Keltner & Folks, 2001).

Neuroleptic medications have been prescribed primarily to treat psychoses in persons with serious mental illness (Kane, 2006; Keltner & Folks, 2005) as well as psychiatric disturbances and severe behavioral problems in persons with developmental disabilities (Advokat, Mayville, & Matson, 2000). These agents have also been used, however, for treating a variety of other conditions and disorders. These disorders include refractory major depression, delusional depressive disorder, anorexia, anxiety, hallucinogen–induced psychosis, agitation in dementia and depression, Huntington's disease, impulsivity, refractory obsessive–compulsive disorder, porphyria, refractory hiccups, itching, antiemetic uses, and personality disorders (Keltner & Folks, 2005).

Unfortunately, neuroleptic medications are associated with a number of side effects, many of which can be

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quite serious. Neuroleptic–induced extrapyramidal side effects, referred to as *abnormal involuntary movements* by the medical community, are among the most serious of these side effects (Deniker, 1970; Gebhardt et al., 2006; Keltner & Folks, 2005; Rivas–Vazquez et al., 2000).

It should be noted that behaviorologists avoid using the terms *voluntary* and *involuntary,* because the implied mystical self–agent necessary for initiating voluntary behavior does not exist and because scientifically all behavior is involuntary behavior. The introduction of neuroleptic agents results in physiological changes to a patient's central nervous system that manifest as dyskinetic movements (i.e., extrapyramidal side effects). Medical clinicians, uninformed regarding the natural science of behaviorology, "slip into the compromising use of agential accounts" (Ledoux, 2012, p. 65) when categorizing movements as either voluntary or involuntary. This illustrates the difficulty encountered when introducing clinical topics, such as extrapyramidal side effects, into a behaviorological discourse. It is with this understanding that agential terms, such as voluntary, involuntary, *psycho*sis, anti*psychotic*, *psych*iatric, *self*, etc., appear in this report when referring to neuroleptic medications, referencing clinical research, and reporting on clinical data.

The extrapyramidal motor system lies in front of the motor strip in the cerebral cortex of the brain and projects to the basal ganglia. The system is important in maintaining equilibrium and coordinating muscle tone and muscle support necessary for engaging in activities such as walking or sitting in a chair without falling over, slumping, or slipping down (Keltner & Folks, 2005; Venes, 2005). Tardive dyskinesia (TD), a difficult to treat, potentially irreversible neurological disorder characterized by constant movements of the mouth, lips, tongue, jaw, trunk, and/or extremities is considered by many to be the most serious neuroleptic–induced extrapyramidal side effect (Cortese, Jog, McAuley, Kotteda, & Costa, 2004; Keltner & Folks, 2005; Kucerová, 2002; Margolese, Chouinard, Kolivakis, Beauclair, & Miller, 2005). TD is frequently associated with shame, guilt, anger, depression (Margolese et al., 2005), social isolation, stigma (Correll, Leucht, & Kane, 2004; Kane, 2001; Oosthuizen et al., 2003; Tandon & Jibson, 2002), and poor employment prospects (Kane, 2001; Tandon, Kasper, Kane, & Juncos, 2000). This disorder is also associated with increased mortality (Tandon & Jibson, 2002) and suicidality in persons with schizophrenia (Margolese, Chouinard, Walters–Larach, & Beauclair, 2001, as cited in Chouinard, 2004). TD may render a person's speech unintelligible; cause respiratory distress, falls (Margolese et al., 2005), and musculoskeletal pain (Schoonderwoerd, 2005); make it difficult to retain dentures and eat (Fabbrini, Barbanti, & Aurilia, 2001); and impede rehabilitation (Kane, 2001; Tandon et al., 2000). TD has doubled in prevalence over the past 20 years despite the introduction and widespread use of atypical antipsychotic agents (i.e., antipsychotic drugs developed after 1990 with a decreased risk for causing extrapyramidal side effects) (Soares–Weiser & Fernandez, 2007).

The term "neuroleptic" references the adverse, rather than beneficial, effects associated with antipsychotic medications. Jean Delay and Pierre Deniker were among the earliest researchers to study the effects of the first antipsychotic drug, chlorpromazine (Thorazine) (Deniker, 1970). The two researchers proposed using the term neuroleptic (from the Greek: "which takes the nerve") in January 1955 to underscore the tendency of these medications to produce significant extrapyramidal side effects (Deniker, 1989). These medication–induced side effects manifest as unpleasant sensations of restlessness, uncontrollable muscular contractions, muscular rigidity, slowed movement, and/or tremor. Extrapyramidal side effects include Parkinsonism, akathisia, dystonia, and TD.

Description of Symptoms

Tardive dyskinetic movements are typically choreatic (repetitive, jerky, irregular, usually short amplitude) (Pierre, 2005); however, they may also present as athetoid (slow, sinuous, or writhing), dystonic (slow and sustained muscle contractions), stereotypic (rhythmic and repetitive), or as a combination of any of these movements (Sachdev, 2000). TD is also associated with impaired finger and toe movements resembling those of a person who is engaged in playing a piano or guitar (Pierre, 2005). The most common clinical presentation of TD involves the buccolingual masticatory syndrome, also referred to as orofacial dyskinesia (grimacing; tongue protrusion; lip–smacking, puckering, and pursing) (Gebhardt et al., 2006; Kane, 2001, Vaddadi, Hakansson, Clifford, & Waddington, 2006). It is unknown why TD involves the lower facial musculature in most individuals (Lohr, Kuczenski, & Niculescu, 2003). In many cases, TD is initially detected by family members and clinicians, because individuals are often unaware of the onset of the movements (Pierre, 2005).

The symptoms of TD can vary from minimal to disabling, although the majority of cases are mild (Fabbrini, Barbanti, & Aurilia, 2001; Oosthuizen et al., 2003). The dyskinetic movements may be momentarily worsened by emotional arousal, stress, and distraction during voluntary movements in areas of the body that are not affected (DSM–IV–TR, 2000). Stimulants, withdrawal from neuroleptic agents, and anticholinergic medications (i.e., a class of drugs often used to treat neuroleptic–induced extrapyramidal side effects) also tend to worsen the symptoms (DSM–IV–TR, 2000). Dyskinetic movements are momentarily reduced by relaxation and by voluntary movements in affected areas of the body; they are typically absent during sleep. TD may be temporarily suppressed by increased doses of neuroleptics or sedatives (DSM–IV–TR, 2000). Finally, the severity of TD may vary over time, improve during the course of neuroleptic therapy, and, in rare cases, spontaneously remit (Margolese & Ferreri, 2007).

Treatment

Treatment strategies for managing the symptoms of TD can generally be classified into three categories: (a) pharmacological, (b) neurosurgical, and (c) behavioral (Johnson, 2002; see Johnson, 2009, for a brief review of each of these approaches to treating TD.) It should be noted that no treatment for TD has been found to be completely satisfactory or effective (Correll et al., 2004; Fabbrini, et al., 2001; Paulson, 2005; Soares–Weiser & Fernandez, 2007). In addition, many medications used for treating TD are associated with adverse effects. For example, common side effects of tetrabenazine, a drug sometimes used for treating TD, are drowsiness, Parkinsonism, depression, insomnia, nervousness, and akathisia (Sachdev, 2000). Tetrabenazine has also been associated with "florid psychiatric symptoms" (e.g., panic attacks, depressive and guilty thoughts, and obsessional ruminations) (Bruneau, Lespérance, & Chouinard, 2002). Further, neurosurgical interventions for treating TD are costly and associated with serious potential side effects, including infection, damage to the optic tract and other vital structures, intracerebral hemorrhage, depression, and behavioral disorders (e.g., suicidality) (Damier et al., 2007; Hyde, Apud, Fisher, & Egan 2005).

Researchers have focused the majority of behavioral treatment research for TD on examining the effects of electromyographic (EMG) biofeedback on TD symptoms (Abrams, 1986; Albanese & Gaarder, 1977; Cotton, 1986; Fudge & Sison, 1997; Fudge, Thailer, Alpert, Intrator, & Sison, 1991; Sherman, 1979). Biofeedback training is an operant conditioning technique that uses instrumentation to record, amplify, and immediately feed back information in the form of a signal (typically a tone or a light) to a trainee regarding the strength of a subtle physiological response over which he or she seeks to gain control (e.g., blood pressure, muscle contractions, heart rate). When treating TD, a trainee learns to reduce tension in affected muscles by decreasing the intensity of the biofeedback signal. Severity of the dyskinetic movements is decreased contingent on a reduction in muscle tension. Biofeedback resulted in decreases in the severity of TD symptoms in participants in each of these studies with no significant side effects.

Although published reports on the use of biofeedback training outnumber those pertaining to other behavioral approaches for treating TD, additional behavioral interventions have been found to be effective in reducing TD symptoms as well. These are listed in Table 1. It should be noted that the most recent report this author was able to find pertaining to behavioral treatment of TD was published in 1997, 11 years prior to when the current study was conducted. (See Johnson, 2009, for a detailed analysis of the studies pertaining to behavioral treatment of TD that are cited in this report.)

Methodological limitations in a number of the behavioral treatment studies make it difficult to evaluate the effect of the behavioral interventions described above. These limitations include (a) lack of baseline measures of the dependent variable (Albanese & Gaarder, 1977; Farrar, 1976; Sherman, 1979), (b) use of subjective methods for measuring the dependent variable (Albanese & Gaarder, 1977; Farrar, 1976; Sherman, 1979), (c) inadequate or weak control for threats to internal and external validity (Abrams, 1986; Albanese & Gaarder, 1977; Cotton, 1986; Farrar, 1976; Frederiksen & Rosenbaum, 1979; Jackson, Schonfeld, & Griffith, 1983; Korein et al., 1976; Sherman, 1979; Wisoki, 1993), and (d) failure to assess the reliability of the data (Abrams, 1986; Albanese & Gaarder, 1977; Farrar, 1976; Sherman, 1979; Wisoki, 1993). In addition, the internal validity of several of these studies (Albanese & Gaarder, 1977; Farrar, 1976; Sherman, 1979) would have been stronger (a) had objective and reliable methods of measurement been used, (b) had baseline measures been collected and reported, and (c) had a withdrawal condition been incorporated into the study design.

All those studies have their limitations, some of which are significant. The results obtained from these studies, however, suggest that behavioral interventions have consistently been effective in reducing TD symptoms. Progressive relaxation training was a component of Abrams' (1986) and Sherman's (1979) treatment protocols, although the effect of the training on TD was not specifically examined. Cotton (1986) and Wisoki (1993) did, however, examine the effects of relaxation training and found that the training resulted in a reduction in the severity of dyskinetic movements.

Among the various behavioral techniques for treating TD that have been studied, biofeedback training has received the most attention. It should be noted, as Cotton (1986) correctly pointed out, that EMG biofeedback training is frequently used as a relaxation technique. Indeed, most of the researchers who examined the effect of biofeedback training on TD focused the training on reducing muscle tension and relaxing specific muscles that were involved in producing the dyskinetic movements.

There are several advantages to using progressive relaxation training, rather than biofeedback training, to treat TD. These include the following: (a) special equipment (e.g., a biofeedback unit) is not required;

Table 1

Additional Behavioral Interventions for Treatment of Tardive Dyskinesia

Study	Intervention
Taylor, Zlutnick, & Hoehle (1979)	Multiple treatments design: *overcorrection* (participants were instructed to exaggerate specific dyskinetic movements for a period of 10–seconds following their occurrence) and *feedback* (participants were praised when they did not engage in dyskinetic movements for 10–second intervals of time; participants were told "You're moving your jaw again" immediately following the occurrence of a dyskinetic movement)
Frederiksen & Rosenbaum (1979)	Withdrawal design: *self–monitoring* (participants recorded each occurrence of a dyskinetic movement), *binary feedback* (participants attempted to suppress dyskinetic movements through the use of a digital timing device that stopped at the onset of dyskinetic movements and resumed only when the movements were terminated), and *videotape feedback* (participants were instructed to watch a television monitor while they were being videotaped and to use the videotape feedback to aid them in suppressing dyskinetic movements)
Jackson, Schonfeld, & Griffith (1983)	Alternating treatments design: *discreet–discrete prompting* (a portable electronic prompting device delivered an "unobtrusive" .5–second duration tone at 10 second intervals to remind the participant to hold her mouth still while she viewed a daily television program) and *video feedback* (the participant received verbal cues at 5–minute intervals instructing her to observe the area around her mouth on a television monitor and to hold those muscles "as still as possible")
Wisocki (1993)	Withdrawal design with changing conditions: *progressive relaxation training* (see above) and *covert reinforcer sampling* (the participant was conditioned to relax affected muscles while imagining a pleasurable scene that she had chosen)

(b) it is not necessary to attach anything, such as electrodes, to participants' bodies; (c) feedback signals, which may be confusing to some individuals, are not used (see the review of Abram's study in Johnson, 2009); and (d) participants can practice the techniques between sessions without assistance. Given these considerations, the effect of progressive relaxation techniques on TD symptoms merits further scrutiny than it has received thus far.

The purpose of this study was to determine whether a specific behaviorological intervention, *progressive neural emotional therapy* (PNET), would result in a reduction in the severity of dyskinetic movements in persons diagnosed with neuroleptic–induced TD. PNET is a "passive cue–controlled progressive relaxation procedure [that] has evolved over the last four decades into a standard method of relaxation training" (Ferreira, 2012, p. 5). When designing the current study, an attempt was made to address the shortcomings of earlier research pertaining to behavioral management of TD. The objectives of this study were to (a) augment the existing body of research pertaining to behavioral treatment for TD, (b) utilize an experimental design that would provide a higher degree of control against threats to internal validity than much of the previous research conducted in this area, and (c) lay the groundwork for the development of a behaviorological treatment protocol for managing TD.

Methods

Setting and Participants

This study was conducted in a county–owned nursing home and outpatient facility in Southern Arizona. Specialty care (e.g., behavioral health care, traumatic brain injury care, neurological care, ventilator and respiratory care, and wound care) is provided at the facility, primarily to persons who are enrolled in the Arizona Long–Term Care System (ALTCS), Arizona's Medicaid program for long–term care beneficiaries. This particular site was chosen because a number of older adults reside there who have been receiving antipsychotic medications for many years to treat various psychiatric disorders. Advanced age, exposure to conventional antipsychotics, and extended duration of antipsychotic treatment have been identified as increasing the risk for developing TD (Caligiuri, Jeste, & Lacro, 2000; Dolder & Jeste, 2003; Fabbrini, et al., 2001; Fountoulakis et al., 2006; Vaddadi et al., 2006). A number of the residents at this facility met each of these criteria.

The study participants were selected from the residents at the nursing home. Each participant had received a diagnosis of neuroleptic–induced TD, by a medical doctor, prior to this study. The facility's Medical Director of Behavioral Health Services assisted with the recruitment process by identifying potential participants and arranging for them to meet with the principal investigator (PI) of the study. The participants ranged in age from 51 to 72 years; all had been receiving antipsychotic medications, including conventional agents, for a number of years. Complete medical records were not available, so it was not possible to determine the participants' length of exposure to neuroleptics. Information regarding the participants' ages, psychiatric diagnoses, and medication regimen at the time the study was being conducted was obtained by a review of records provided by the nursing home.

Participant 1. Participant 1 was a 72–year–old male who had received the following diagnoses: dementia with lewy bodies, dementia with behavioral disturbance, paralysis agitans (i.e., Parkinson's disease), bipolar disorder unspecified, and depressive disorder. At the time of this study, Participant 1 was receiving the following psychotropic medications: lorazepam (Ativan, an anxiolytic medication), carbidopa–levodopa (Sinemet, a medication used to treat parkinsonism), trazodone (an antidepressant medication), and quetiapine (Seroquel, an atypical antipsychotic medication). Participant 1's orofacial dyskinesia manifested as jaw movements (i.e., slow chewing movements), thrusting of the lower lip, and tremor in the cheek and mouth muscles.

Participant 2. Participant 2 was a 51–year–old male who had received the following diagnoses: anoxic brain damage, mood disorder, intracranial injury without skull fracture, chronic meningitis, and anxiety state. At the time of this study, Participant 2 was receiving the following psychotropic medications: valproic acid (Depakote, an antiseizure medication), lithium (to treat depression), clonazepam (Klonopin, to treat anxiety), and trazodone (to treat insomnia). Participant 2's orofacial dyskinesia manifested as movements of the jaw (i.e., chewing), tongue movements (i.e., licking the lips), eye–rolling, forehead and eyebrow movements, biting the lower lip, and lip pursing and smacking.

Participant 3. Participant 3 was a 60–year–old male who had received the following diagnoses: intellectual disability, seizure disorder, schizoaffective disorder, adjustment reaction disorder, and depression. He had also been experiencing anxiety, depression, paranoia, insomnia, visual and auditory hallucinations, and suicidal ideations. At the time of this study, Participant 3 was receiving the following psychotropic medications: phenytoin (Dilantin, an antiseizure medication) and mirtazapine (Remeron, an antidepressant medication). Participant 3's orofacial dyskinesia manifested as jaw movements (i.e., chewing and mouth opening and closing), tongue movements (primarily within the buccal cavity, particularly behind the lower lip), blinking, eye–rolling, forehead and eyebrow movements, grimacing, and lip smacking.

Dependent Variable

The dependent variable, orofacial dyskinesia, is defined as any movement involving the muscles of the face, mouth, jaw, or tongue. These movements include protrusion of the tongue, pushing of the tongue into the cheek or any other area within the oral cavity, tongue movements within the buccal cavity, licking the lips, chewing, sucking, puckering the lips, pursing the lips, smacking movements of the lips and mouth, opening and closing the jaw, biting, forehead furrowing, eyebrow movements, grimacing, blinking, eye rolling movements, and tremors in any area of the face, mouth, jaw, or tongue.

Design and Procedure

A multiple–baseline–across–subjects design was used to evaluate whether PNET is effective or not in reducing the severity of orofacial movements in the study participants. Multiple baseline across subjects designs involve implementation of an intervention across two or more participants at different points in time. Staggering the implementation of the intervention serves to minimize alternative explanations for changes in behavior; the number of baselines contributes to the strength of the demonstration (Morgan & Morgan, 2009). Most researchers consider two or three participants to be the minimum necessary to provide an adequately convincing conclusion in a multiple–baseline design (Kazdin, 2001; Morgan & Morgan, 2009).

This single subject design was chosen over a withdrawal design for the following reasons: (a) The effects from relaxation training cannot be withdrawn or reversed (Cotton, 1986); (b) participants may have found it undesirable to withdraw the intervention due to the severity of their dyskinetic movements; and (c) the additional baselines would serve as controls against which the effects of the treatment could be assessed.

In addition, an attempt was made to meet the following conditions, which are based on criteria identified by Richards, Taylor, Ramasamy, and Richards (1999) as being essential to the successful implementation of multiple–baseline–across–subjects designs: (a) The participants displayed the same behavior of concern (i.e., orofacial dyskinesia) in the same setting (i.e., the clinical intervention room); (b) the participants were similar enough to one another to expect that each would respond to the PNET procedure and yet would not likely respond until such time as the intervention was specifically implemented to treat their orofacial dyskinetic movements; (c) there was a reasonable expectation that the same variables (i.e., independent and extraneous) would exert the same influence on each of the participants; (d) the PNET procedure was likely to have a similar effect on each participant; (e) a consistent recording procedure was selected for measuring orofacial movements across participants and a criterion level for initiating the intervention for each participant was identified; and (f) there was reasonable expectation that the resources would be available to maintain data collection and interventions for the duration of the study.

The participants in this study agreed to receive two sessions per day, on consecutive days, for a total of 17 sessions. Participants did, however, miss some sessions. Reasons for missed sessions are detailed later in this report.

Method of Measuring the Dependent Variable

The PI videotaped the participant's faces for the duration of each session. A video camcorder was mounted on a tripod that was situated at a distance of approximately 4 feet and directly in front of the reclining chair that participants were seated in during the intervention sessions. The PI began recording as a participant entered the room. After the participant was seated and the chair had been reclined to its lowest position, the PI adjusted the video camcorder so that the participant's face and head were within the video frame. The PI stopped the video camcorder as the participant left the room.

Following the sessions, the PI transferred the videotape data to a compact disc. The PI then reviewed the videotape data and recorded momentary time sampling data on the dependent variable, using ten–second intervals, for a period of five minutes. Momentary time sampling is a time–based method of recording behavior during which an observation period is divided into discrete units of time (i.e., intervals) and the behavior is scored either as occurring ("+") or not occurring ("–") at the conclusion of each interval (Umbreit, Ferro, Liaupsin, & Lane, 2007). This method of measuring the dependent variable was chosen for the following reasons: (a) momentary time sampling is practical when measuring nonuniform behaviors (i.e., behaviors, such as tardive dyskinesia, that tend to vary in length) that are likely to persist for extended periods of time (Richards et al., 1999; Sulzer–Azaroff & Mayer, 1991; Umbreit et al., 2007) and (b) momentary time samples using short intervals tend to more accurately depict the rate of occurrence of frequently occurring behaviors (Sulzer–Azaroff & Mayer, 1991).

Clinical Intervention Environment

The PNET sessions were conducted in a 12 foot by 17 foot room located within the nursing home's Activity Room. This room is used by staff and by residents for group therapy sessions and meetings. The room is also used for storing a few folding chairs and office chairs as well as three televisions and videocassette recorders that are situated on stands with wheels. A reclining chair was centrally located in the room for the participants to sit in during the sessions. The PI sat in a straight chair that was located to the right of the recliner. A compact disc player was placed on a folding chair to the immediate left of the PI. The compact disc player was used for playing a recorded surf sound during the progressive relaxation training sessions (see Ferreira, 2012). A single floor lamp, positioned against a wall directly behind the PI, provided indirect lighting during the sessions. Finally, a long rectangular table was located along the wall of the room to the left of the recliner and a hutch was located against the wall behind the recliner.

Baseline Phase

During the baseline condition, participants were asked by the PI to enter the clinical room and sit on the reclining chair. Once the participant was seated, the PI slowly reclined the chair and instructed the participant to make himself comfortable while the video camera was being adjusted. Once the camera was adjusted, the PI sat down in the chair to the right of the recliner and then asked the participant if he was comfortable. The session began when the participant indicated that he was comfortable. During the session, the PI conversed with the participant for an average of 15 minutes and then asked the participant to sit quietly for five minutes so that baseline data could be collected on the dependent variable. After the five–minute baseline data collection period, the PI instructed the participant that the session was over, returned the reclining chair to an upright position, thanked the participant, and then escorted him to the door of the training room. Each participant engaged in from three to seven baseline sessions.

Intervention Phase

PNET was initiated for the first participant after a stable rate of occurrence of orofacial movements had been obtained across three baseline sessions. During the intervention condition, the PI asked the participant to enter the training room and sit on the reclining chair. The PI slowly reclined the chair and instructed the participant to make himself comfortable while the video camera was being adjusted. Once the camera was adjusted, the PI sat down in the chair to the right of the recliner and then asked the participant if he was comfortable. PNET training was initiated after the participant indicated that he was comfortable. The protocol used for this study was adapted from a procedure developed by Ferreira (1994) who recently published a standardized protocol description (2012). Specific emphasis was placed on relaxing facial and tongue muscles during the PNET session. Sessions were approximately 35 minutes in duration. Participants were observed throughout each training session for the purpose of monitoring their overall relaxation responses. The PI recorded these observational data on a PNET Monitoring Form, represented in Figure 1, that also was adapted from Ferreira (1994) who recently published a standardized monitoring checklist form (2012).

The intervention was initiated for the second participant after the first participant had achieved a downward trend in the rate of orofacial movements across four consecutive sessions. Finally, the intervention was initiated for the third participant following a downward trend in the rate of the second participant's orofacial movements across five consecutive sessions.

Data Collection

Baseline phase data collection. Collection of momentary time sampling data from videotaped baseline sessions was initiated after the participants had responded to the PI's request to sit quietly for five minutes so that their facial movements could be videotaped. A response to this request was determined to have occurred after participants had sat in the recliner without talking or moving their arms, legs, or torso for a period of 30 seconds (i.e., three consecutive time sampling intervals). Momentary time sampling data on the dependent variable were recorded, for a period of five minutes during the baseline sessions, using ten–second intervals. A MotivAider® (MotivAider, 2000) was utilized for measuring the intervals during both the baseline and the intervention phases.

Intervention phase data collection. Collection of momentary time sampling data from videotaped intervention sessions was initiated after (a) the PNET protocol had been implemented through step 8 (see Appendix A) and (b) following step 8, 30 seconds had elapsed during which no orofacial dyskinetic movements were observed to have occurred (i.e., three consecutive time sampling intervals). It should be noted that when collecting data during the intervention phases, the PI (a) started each videotape at a random point following step 8 (i.e., observation periods were not predetermined), (b) observed the videotape, and (c) initiated time sampling data collection after 30 seconds had elapsed without the appearance of dyskinetic movements. If orofacial dyskinetic movements persisted following step 8, data collection was initiated following implementation of step 9 of the PNET protocol (see Appendix A). Momentary time sampling data on the dependent variable was recorded for a period of five minutes during the intervention sessions, using ten–second intervals.

Data Analysis

Visual inspection of graphically displayed data is the typical means of evaluating whether the experimental criterion have been met in a single–subject design experiment (Kazdin, 1982). Graphically displayed momentary time sampling data were used to determine whether the independent variable was responsible for changes observed in the rate of orofacial dyskinetic movements following the initiation of the intervention phases for each of the participants.

Interobserver Agreement (IOA)

A research collaborator was trained in the response definition (i.e., orofacial dyskinetic movements) by the

PNET Monitoring Form

Name: ______________________ Date: ______________ Time Start: __________

Rater: ______________________ Pre–Score: ___________ Time Stop: ___________

Session #: ____________________ Post–Score: __________

MUSCLE GROUP		***Tense***		***SCORE***		***Relaxed***
1.	Right Hand & Forearm	1	2	3	4	5
2.	Right Bicep & Shoulder	1	2	3	4	5
3.	Left Hand & Forearm	1	2	3	4	5
4.	Left Bicep & Shoulder	1	2	3	4	5
5.	Neck	1	2	3	4	5
6.	Forehead	1	2	3	4	5
7.	Eyes	1	2	3	4	5
8.	Mouth	1	2	3	4	5
9.	Abdomen	1	2	3	4	5
10.	Right Leg	1	2	3	4	5
11.	Left Leg	1	2	3	4	5
12.	Entire Body	1	2	3	4	5

Total Score Achieved:______

Notes: Relax = loose, limp muscle tone, supported by a subjective verbal report
Tense = rigid, tight muscle tone, supported by a subjective verbal report

Relaxation Score = (Total Score Achieved **/** 60) **x** 100 = _____ **%**

Observations:

Figure 1: PNET Monitoring Form

(Adapted from page 8 of "Relaxation Training for People with Severe Mental Retardation," a presentation by Ferreira at the American Association on Mental Retardation National Convention, Boston MA, in 1994. For a more recent, standardized checklist, see Ferreira, 2012.)

PI. This was accomplished by reviewing the operational definition for the dependent variable, as described above, and then providing visual examples of specific dyskinetic movements from videotape data collected during the course of the study. After receiving the training, the research collaborator independently recorded momentary time sampling data on the dependent variable from the videotape data that were collected during the sessions. Videotape data for these reliability checks were selected by the collaborator after the PI had shuffled the compact discs containing the data and spread them out on a table. The collaborator was blind to specific participants and sessions during this selection process. Momentary time sampling data were collected by the collaborator on the dependent variable for one baseline session and two intervention sessions for each participant. The timing of the IOA observation periods coincided with the timing of the five–minute observation periods during which the PI had previously collected momentary time sampling data (the PI had written the timings of the observation periods on the compact discs so that they could be located for IOA data collection). The momentary time sampling data collected by the collaborator were then compared with the PI's momentary time sampling data from corresponding sessions. Reliability estimates were computed by dividing the number of agreements (i.e., number of identical intervals that received the same score by the PI and the collaborator) by the total number of intervals and multiplying the result by 100%.

Treatment Integrity

Treatment integrity of the PNET procedure was assessed by the research collaborator for six sessions during the intervention phases. This was done to verify the functional relationship between the independent and dependent variables. Treatment integrity data were collected by having the research collaborator rate either the presence or the absence of each component of the relaxation training protocol on a treatment integrity form. Session integrity was computed by dividing the total number of components that were actually completed during each session by the number of components that should have been completed (i.e., 15) and multiplying the result by 100. Component integrity was computed by dividing the total number of times each component was completed by the total number of times treatment integrity was assessed and multiplying the result by 100.

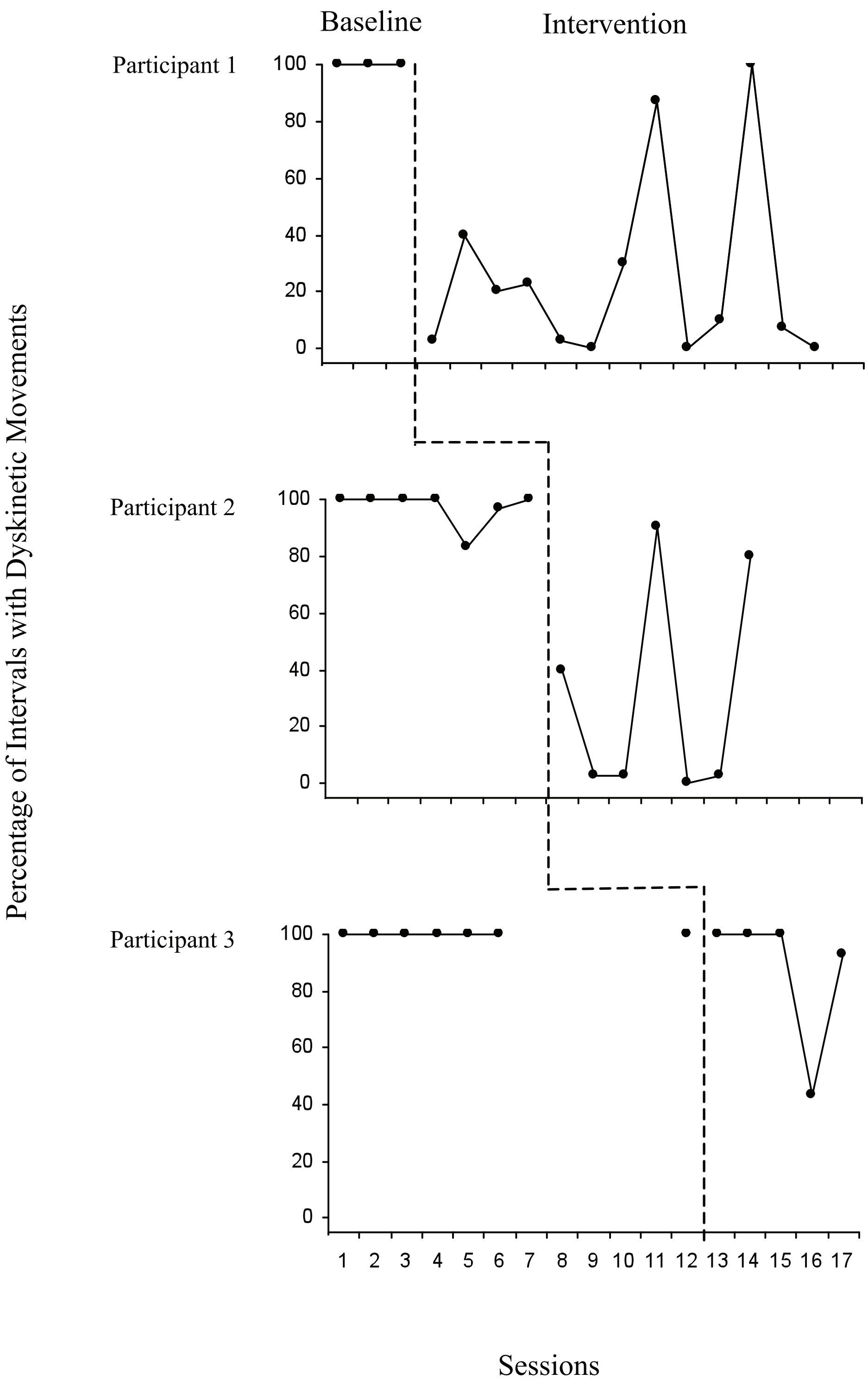

Figure 2. Percentage of Dyskinetic Movements

Results

Rate of Orofacial Dyskinetic Movements

As shown in Figure 2, Participant 1's orofacial dyskinetic movements occurred during 100% of the observed intervals during the baseline phase and decreased markedly during the intervention phase (mean = 25%; range = 0%–100%). It should be noted that muscle tremors observed in the orofacial area were scored as dyskinetic movements because it was not possible to differentiate between parkinsonian symptoms and TD symptoms. Further, there was a considerable amount of noise outside of the clinical training room throughout sessions 11 and 14 (i.e., several residents were playing cards in the Activities Room and speaking loudly during session 11; workers were testing the fire alarm system in the building during session 14). This noise could be heard clearly in the clinical training room and may account for the higher scores obtained during those sessions. Session 17 (i.e., the final intervention session) was terminated at the request of Participant 1 because the level of sound filtering in from the environment outside of the clinical training room was quite high (a church group was performing Easter music for the residents). No data were collected for this session.

In a similar manner, the mean level of Participant 2's orofacial dyskinetic movements decreased markedly from 97% (range = 83%–100%) during the baseline phase to a mean level of 31% during the intervention phase (range = 0%–90%; see Figure 2). The environment outside of the clinical training room was quite noisy while implementing the intervention with Participant 2 during sessions 11 and 14 as well. This likely affected his response to the intervention, as evidenced by the higher scores obtained during those sessions. Participant 2 elected to withdraw from the study following session 14. He did not indicate his reason for withdrawing.

Participant 3's orofacial dyskinetic movements occurred during 100% of the observed intervals during the baseline phase and decreased slightly to a mean level of 87% during the intervention phase (range = 43% – 100%; see Figure 2). Several factors should be considered when analyzing the data for Participant 3. These include the following: (a) Participant 3's dyskinetic movements were more pronounced than those of the other participants; (b) Participant 3 missed a total of five baseline condition sessions after he was admitted to a psychiatric hospital after reporting that he was experiencing suicidal thoughts and auditory and visual hallucinations; and (c) when he resumed the sessions, Participant 3 continued to report that he was experiencing suicidal thoughts and auditory and visual hallucinations and that "the medications still aren't working." Participant 3 did insist, however, that the PNET sessions were "helping" and indicated his desire to continue to participate in the study. It should further be noted that the magnitude of Participant 3's orofacial dyskinetic movements appeared to improve upon implementing the intervention. This would likely have been detected if instrumentation (e.g., electromyographic recordings) or an observational rating scale for "involuntary" movements, such as the Abnormal Involuntary Movement Scale (AIMS) (Guy, 1976) or the Dyskinesia Identification System Condensed User Scale (DISCUS) (Sprague, Kalachnik, & Shaw, 1989) had been used for measuring the dependent variable. Momentary time sampling is not designed to measure the magnitude of a behavior.

Finally, it should be noted that none of the participants was able to sustain relaxation of their orofacial muscles (i.e., a complete absence of orofacial dyskinetic movements) for the remainder of a session once criteria had been met for initiating data collection. Participants 1 and 2, however, did engage in several episodes of sustained relaxation of their orofacial muscles during each session, both before and after the designated data collection periods. It was beyond the scope of this study to determine why the participants were unable to maintain relaxation of these muscles.

Reliability and Treatment Integrity Data

The IOA scores obtained for the *Phase 1* baseline condition were: Participant 1, 100%; Participant 2, 100%, and Participant 3, 100%. The IOA scores obtained for the *Phase 2* intervention condition were: Participant 1, 100% and 97% (mean = 99%); Participant 2, 100% and 97% (mean = 99%); and Participant 3, 100% and 80% (mean = 90%). Session integrity and component integrity were maintained 100% of the time during the sessions in which treatment integrity data were obtained.

Discussion

The purpose of the present study was to determine whether or not PNET would reduce the severity of dyskinetic movements in persons diagnosed with neuroleptic–induced TD. The study was specifically designed to address the following research question: Does PNET have any effect on TD that is manifested in the orofacial region? Further, it was hypothesized that PNET would result in a decrease in the severity of TD symptoms as evidenced by a reduction in the rate of occurrence of orofacial movements in the study participants.

Visual inspection of Figure 2 reveals that the mean rates of occurrence of orofacial dyskinetic movements decreased markedly in Participants 1 and 2 upon implementation of the intervention. The mean rate of occurrence of orofacial dyskinetic movements also decreased in Participant 3 after the intervention was introduced; however, the initial effect was not as dramatic as that observed in the other two participants (i.e., a decrease was not observed until the fourth intervention session). Possible explanations for this variation in the response rate include the higher level of magnitude of Participant 3's dyskinetic movements, the presence of potentially interfering covert stimuli (as evidenced by self–reports of suicidal ideation and visual and auditory hallucinations), and missed sessions during the baseline phase. It should be pointed out again that the magnitude of Participant 3's orofacial dyskinetic movements appeared to improve upon implementing the intervention; it was not possible, however, to detect this change with momentary time sampling. Finally, the intrusion of noise into the clinical environment during sessions 11 and 14 competed with the presentation of PNET stimuli. There was a corresponding increase in the severity of orofacial dyskinesia for Participant 1 and Participant 2 in response to this noise.

The severity of each participant's orofacial TD improved (i.e., the rate of occurrence decreased) when the intervention was introduced. Treatment integrity data indicate that the intervention was implemented at a high level of fidelity. Likewise, IOA data reveal a high level of reliability in the data that were collected on the dependent variable during the course of the study. Therefore, a clear functional relationship was established between the independent variable (i.e., PNET training) and the dependent variable (i.e., severity of orofacial TD). These data indicate that PNET can provide an effective means for decreasing the severity of orofacial TD.

In the current study, an attempt was made to address the methodological limitations of previous research pertaining to behavioral treatment for TD. Use of a multiple–baseline–across–subjects design was critical to accomplishing this task. A small sample of participants was included in this study; however, replication of the effect of the independent variable on the dependent variable during the intervention phases served to minimize alternative explanations for the observed changes. To further strengthen the internal validity of this study, (a) baseline levels of the dependent variable were obtained for each participant, (b) the dependent variable was monitored for each participant throughout the study, (c) an objective method for measuring the dependent variable was utilized, (d) criteria were established for determining the data collection periods, and (e) reliability data were collected and assessed.

Limitations

The present study had several limitations. First, only three participants were included in the study. A large pool from which to recruit participants was not available due to the low incidence of TD in the general population. Replication of this study is necessary in order to determine whether the results can be extended to other persons with TD. Second, although every attempt was made to address each of the conditions that were identified above as being essential to implementing a successful multiple–baseline–across–subjects design (Richards et al., 1999), it was not possible to ascertain whether they were, in fact, all met (e.g., it was not possible to determine whether participants were going to experience psychotic symptoms during the course of the study). Third, as noted above, it was not possible to detect, with momentary time sampling, variations in the magnitude of the dependent variable that may have occurred during the course of the study. Furthermore, momentary time sampling can either overestimate or underestimate the occurrence of the behavior that is being assessed (Sulzer–Azaroff & Mayer, 1991). In the present study, short intervals (i.e., ten–seconds) were used during the momentary time sampling periods in an attempt to minimize this distortion. Finally, the fact that it was not possible to control extraneous variables in the environment, such as noise level, likely affected participant's responses to the intervention during at least two sessions.

Although an attempt was made to standardize the data collection procedure (i.e., data collection was initiated during the baseline and intervention conditions according to criteria specified above), internal validity would have been stronger if an instrumental approach had been utilized for assessing the data. Doing so (a) would have allowed for objective and continuous assessment of the dependent variable for the duration of each session, (b) would have either minimized or eliminated any distortion that may have occurred due to momentary time sampling, and (c) would have made it possible to record and assess both the rate of occurrence as well as the magnitude of the dyskinetic movements. A computer program designed to analyze dyskinetic movements from video data would be one good method for instrumentally assessing orofacial TD. The means for collecting the data would be no more intrusive than the method that was utilized for collecting videotape data in the current study. Alternative methods for collecting data instrumentally (e.g., electromylographic recordings) typically involve attaching electrodes to the skin over affected muscles. The presence of electrodes could potentially interfere with relaxation of the orofacial muscles.

Implications and Recommendations for Future Research and Practice

The results obtained during the present study appear to be similar to those obtained from previous research pertaining to behavioral management of TD in that the severity of the participant's orofacial dyskinetic movements decreased when the independent variable was introduced. This study is significant in that a progressive relaxation–based intervention, PNET, was examined by itself; it was not a component of a combination treatment protocol, nor was it compared with other interventions in an alternating treatments design (see Johnson, 2009). As noted earlier there are considerable advantages to progressive relaxation–based interventions over other behavioral interventions that have been studied for TD management (i.e., the procedure is relatively straightforward; special equipment is not needed; no sensors are attached to the trainees; feedback signals, which could be confusing to some trainees, are not used; and the techniques can be practiced by trainees between sessions without assistance). The decrease in severity of the participants' orofacial dyskinetic movements suggests that PNET may provide a viable option to the more invasive pharmacological and surgical approaches for managing this disorder.

Although attempts were made to control the environment in which the training was implemented, noise from outside of the training room competed with the presentation of PNET stimuli during several sessions. The severity of participants' dyskinetic movements increased, apparently in response to the noise. This underscores the importance of insuring that extraneous noise is minimized when conducting PNET sessions.

It was beyond the scope of this study to address the participants' generalization of intervention responses to situations and settings outside the clinical environment. Future research should address this critical issue. A possible way of doing so would be through implementation of the "transfer phase" of PNET (see Ferreira, 2012) during which participants would be conditioned to respond physiologically to the mand "relax." Once established, mands, or verbal cues, have been found to produce a relaxation response without the need to engage in the full relaxation procedure (Lindsey, Fee, Michie, & Heap, 1994). Implementation of this phase of PNET should be explored for TD management, because it may enable individuals to manage dyskinetic movements outside the clinical environment.

Finally, in addition to orofacial dyskinetic symptoms, Participant 1 also experienced a persistent tremor in the orofacial area due to Parkinson's disease. This tremor was scored as a dyskinetic movement when it occurred during the observation sessions. It is noteworthy that the tremor was observed to subside during implementation of PNET. This finding suggests that PNET should be examined with regard to management of Parkinsonian symptoms.

Conclusion

Neuroleptic medications have greatly influenced psychiatric care and treatment since their introduction in the 1950s. The fact that neuroleptics may, and often do, cause a number of significant side effects is the downside to their use as therapeutic agents. Tardive dyskinesia, a potentially irreversible movement disorder, is regarded as being among the most serious side effects associated with these medications.

While no approach to treatment has been found to be completely effective in all cases for managing the disorder, behavioral interventions have been shown to decrease the severity of TD with far fewer, and less severe, adverse side effects than pharmacological and neurosurgical alternatives. The present study was designed to examine the effects of a specific behaviorological intervention, PNET, on the severity of orofacial tardive dyskinesia. A clear functional relationship was established between the dependent and independent variables in this study, indicating that PNET may be of benefit either as an alternative or as an adjunct to pharmacological and surgical methods for managing TD. In conclusion, although the current study was preliminary in nature, the results that were obtained provide a foundation upon which to develop a behaviorological treatment protocol for managing TD.

Appendix A
PNET Protocol

The following PNET training procedure was implemented by the PI with each study participant:

1. Greet the participant as he enters the training room.
2. Instruct the participant to sit in the reclining chair.
3. Recline the reclining chair to its lowest position.
4. Ask the participant to make himself comfortable.
5. After a few moments, ask the participant if he is comfortable. When the participant indicates that he is comfortable, instruct him to take three diaphragmatic breaths in the following manner: "We always begin by taking three very slow and gentle deep breaths; breathing in through your nose, holding your breath for a few moments, and then breathing out through your mouth. Now let's take your first breath. Breathe in through your nose [researcher models inhaling] and hold it… hold it… hold it… And now breathe out through your mouth [researcher models exhaling]. That's it, thinking about how good it feels to relax. Now let's take your second breath [researcher models inhaling] and hold it… hold it… hold it… And breathe out through your mouth [researcher models exhaling]. Very good. And now let's take the last breath [researcher models inhaling] and hold it… hold it… hold it… And breathe out through your mouth [researcher models exhaling]."
6. Turn on a compact disc recording of an ocean surf sound while telling the participant, "As I turn on the surf sound, I'd like you to continue to think about how good it feels to relax." Six to seven surfs are generated per minute on the ocean surf compact disc recording.
7. Begin to instruct the participant to relax by suggesting "think about letting your hands relax." The researcher times the word "relax" so that it is stated simultaneously with the rhythm of the surf sound. The final consonant of the word "relax" is extended and gradually faded to mimic the fading of each surf sound. The participant is instructed to relax his hands at least two

more times, using statements such as "letting your hands relax," "easy and relax," and "more and more relax."

8. Additional instructions may be used, including "feeling comfortable and relax," "breathing easy and relax," "feels so good to relax," "very, very good, just relax," "thinking only of relax," "deeper and deeper relax," "feeling rested and relax," "remembering that the more relaxed you are, the better you feel," and "feeling peaceful and relaxed."

9. Continue the relaxation training process until each of the following areas have been addressed: hands, arms, shoulders, forehead, eyes, face, mouth, jaw, neck, upper back, lower back, chest, stomach, legs, and feet.

10. Repeat the procedure for relaxing all of the areas of the body, giving additional attention to relaxing the muscles of the face, mouth, and jaw. The word "keeping" may be substituted for the word "letting" during this step (e.g., "Think about 'letting' your face relax… 'Keeping' your face relaxed…").

11. Allow the participant several minutes to enjoy the feeling of being relaxed: "I'm going to stop talking for a few minutes so that you can enjoy the feeling of being relaxed."

12. Repeat the procedure of relaxing all of the areas of the body identified above. Two to three areas may be addressed simultaneously during this step (e.g., "Think about keeping your hands, arms, and shoulders relaxed. Keeping your hands, arms, and shoulders relaxed…").

13. The relaxation session is terminated as follows: Turn off the ocean surf compact disc, then state "We always end each session by taking three slow and gentle deep breaths. Breathe in through your nose [researcher models inhaling] and hold it… hold it… hold it… Now breathe out through your mouth [researcher models exhaling]. That's it, very, very good. Let's take the second breath [researcher models inhaling] and hold it… hold it… hold it… And breathe out through your mouth [researcher models exhaling]. Good, feeling rested and relaxed. Now, taking the last breath [researcher models inhaling] and hold it… hold it…hold it… And breathe out through your mouth [researcher models exhaling]. Remembering to stay relaxed for the rest of the day."

14. Wait for several seconds, then raise the reclining chair to the upright position, shake the participant's hand, and ask how he is feeling. Respond appropriately to the participant's subjective report.

15. Thank the participant and then accompany him to the door of the clinical training room.♣

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Syllabus Directory

Each issue of *Behaviorology Today* contains these two lists, which show where to find the most up–to–date versions (in title and content) of TIBI's current course syllabi. The first list locates syllabi by volume and number while the second list locates syllabi by course number.

Current Syllabi by Volume & Number

Volume 7, Number 2 (Fall 2004): BEHG 101:
*Introduction to Behaviorology I.**
Volume 7, Number 2 (Fall 2004): BEHG 102:
*Introduction to Behaviorology II.**
Volume 7, Number 2 (Fall 2004): BEHG 201:
*Non–Coercive Child Rearing Principles and Practices.**
Volume 7, Number 2 (Fall 2004): BEHG 355:
*Verbal Behavior I.**
Volume 8, Number 1 (Spring 2005): BEHG 400:
Behaviorological Rehabilitation.
Volume 8, Number 1 (Spring 2005): BEHG 415:
*Basic Autism Intervention Methods.**
Volume 8, Number 1 (Spring 2005): BEHG 420:
*Performance Management and Preventing Workplace Violence.**
Volume 8, Number 1 (Spring 2005): BEHG 425:
*Non–Coercive Classroom Management and Preventing School Violence.**
Volume 8, Number 1 (Spring 2005): BEHG 475:
*Verbal Behavior II.**
Volume 8, Number 2 (Fall 2005): BEHG 410:
Behaviorological Thanatology and Dignified Dying.
Volume 9, Number 1 (Spring 2006): BEHG 365:
Advanced Behaviorology I.
Volume 9, Number 2 (Fall 2006): BEHG 470:
Advanced Behaviorology II.
Volume 10, Number 1 (Spring 2007): BEHG 120:
Non–Coercive Companion Animal Behavior Training.

Current Syllabi by Course Number

BEHG 101: *Introduction to Behaviorology I:*
Volume 7, Number 2 (Fall 2004).*
BEHG 102: *Introduction to Behaviorology II:*
Volume 7, Number 2 (Fall 2004).*
BEHG 120: *Non–Coercive Companion Animal Behavior Training:*
Volume 10, Number 1 (Spring 2007).
BEHG 201: *Non–Coercive Child Rearing Principles and Practices:*
Volume 7, Number 2 (Fall 2004).*
BEHG 355: *Verbal Behavior I:*
Volume 7, Number 2 (Fall 2004).*
BEHG 365: *Advanced Behaviorology I:*
Volume 9, Number 1 (Spring 2006).
BEHG 400: *Behaviorological Rehabilitation:*
Volume 8, Number 1 (Spring 2005).
BEHG 410: *Behaviorological Thanatology and Dignified Dying:*
Volume 8, Number 2 (Fall 2005).
BEHG 415: *Basic Autism Intervention Methods:*
Volume 8, Number 1 (Spring 2005).*
BEHG 420: *Performance Management and Preventing Workplace Violence:*
Volume 8, Number 1 (Spring 2005).*
BEHG 425: *Non–Coercive Classroom Management and Preventing School Violence:*
Volume 8, Number 1 (Spring 2005).*
BEHG 470: *Advanced Behaviorology II:*
Volume 9, Number 2 (Fall 2006).
BEHG 475: *Verbal Behavior II:*
Volume 8, Number 1 (Spring 2005).* ∽

*An older version appeared in an earlier issue.

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The intrinsic value of TIBIA membership rests on giving the member status as a contributing part of an organization helping to extend and disseminate the findings and applications of the natural science of behavior for the benefit of humanity. The levels of TIBIA membership include one "free" level and four paid levels, which have increasing amounts of basic benefits. The four annual paid membership levels are Student, Affiliate, Associate, and Advocate. The Student and Affiliate are non–voting categories, and Associate and Advocate are voting categories. All new members are admitted provisionally to TIBIA at the appropriate membership level. Advocate members consider each provisional member and then vote on whether to elect each provisional member to the full status of her or his membership level or to accept the provisional member at a different membership level. Here are these membership levels and their criteria and basic benefits (dues details are under *TIBIA Membership Cost Details* on the application page):

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$20 *Behaviorology Student membership* (requires completed paper application co–signed by department chair or advisor, and dues payment). Admission to TIBIA in the Student membership category is open to all who are undergraduate or graduate students who have not yet attained a doctoral level degree in behaviorology or in an acceptably appropriate area. Benefits include *all* those from the online membership level plus these: (a) a subscription to the paper–printed issues of *Behaviorology Today* (ISSN 1536–6669), (b) access to available TIBIA member contact information, and (c) access to special organizational activities (e.g., invitations to attend TIBI conferences, conventions, workshops, etc.).

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*TIBI / TIBIA Purposes**

TIBI, as a non–profit educational corporation, is dedicated to many concerns. TIBI is dedicated to teaching behaviorology, especially to those who do not have university behaviorology departments or programs available to them; TIBI is a professional organization also dedicated to expanding the behaviorological literature at least through the magazine/newsletter *Behaviorology Today* (originally called *TIBI News Time*) and the *Behaviorology and Radical Behaviorism* journal;** TIBI is a professional organization also dedicated to organizing behaviorological scientists and practitioners into an association (The International Behaviorology Institute Association—TIBIA) so they can engage in coordinated activities that carry out their shared purposes. These activities include (a) encouraging and assisting members to host visiting scholars who are studying behaviorology; (b) enabling TIBI faculty to arrange or provide training for behaviorology students; and (c) providing TIBI certificates to students who successfully complete specified behaviorology curriculum requirements. And TIBI is a professional organization dedicated to representing and developing the philosophical, conceptual, analytical, experimental, and technological components of the separate, independent discipline of behaviorology, the comprehensive natural science discipline of the functional relations between behavior and independent variables including determinants from the environment, both socio–cultural and physical, as well as determinants from the biological history of the species. Therefore, recognizing that behaviorology's principles and contributions are generally relevant to all cultures and species, the purposes of TIBI are:

A. to foster the philosophy of science known as radical behaviorism;

B. to nurture experimental and applied research analyzing the effects of physical, biological, behavioral, and cultural variables on the behavior of organisms, with selection by consequences being an important causal mode relating these variables at the different levels of organization in the life sciences;

C. to extend technological application of behaviorological research results to areas of human concern;

D. to interpret, consistent with scientific foundations, complex behavioral relations;

E. to support methodologies relevant to the scientific analysis, interpretation, and change of both behavior and its relations with other events;

F. to sustain scientific study in diverse specialized areas of behaviorological phenomena;

G. to integrate the concepts, data, and technologies of the discipline's various sub–fields;

H. to develop a verbal community of behaviorologists;

I. to assist programs and departments of behaviorology to teach the philosophical foundations, scientific analyses and methodologies, and technological extensions of the discipline;

J. to promote a scientific "Behavior Literacy" graduation requirement of appropriate content and depth at all levels of educational institutions from kindergarten through university;

K. to encourage the full use of behaviorology as the essential scientific foundation for behavior related work within all fields of human affairs;

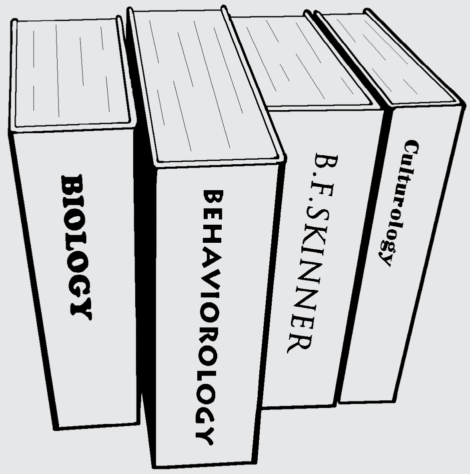
L. to cooperate on mutually important concerns with other humanistic and scientific disciplines and technological fields where their members pursue interests overlapping those of behaviorologists; and

M. to communicate to the general public the importance of the behaviorological perspective for the development, well–being, and survival of humankind.

*This statement of the TIBI / TIBIA purposes has been adapted from the TIBI by–laws.

**This journal (BARB) is under development at this time and will appear only when its implementation can be fully and properly supported.—Ed.

About Behaviorology, TIBI, and *Behaviorology Today*



Behaviorology is an independently organized discipline featuring the natural science of behavior. Behaviorologists study the functional relations between behavior and its independent variables in the behavior–determining environment. Behaviorological accounts are based on the behavioral capacity of the species, the personal history of the behaving organism, and the current physical and social environment in which behavior occurs. Behaviorologists discover the natural laws governing behavior. They then develop beneficial behaviorological–engineering technologies applicable to behavior related concerns in all fields including child rearing, education, employment, entertainment, government, law, marketing, medicine, and self–management.

Behaviorology features strictly natural accounts for behavioral events. In this way behaviorology differs from disciplines that entertain fundamentally superstitious assumptions about humans and their behavior. Behaviorology excludes the mystical notion of a rather spontaneous origination of behavior by the willful action of ethereal, body–dwelling agents connoted by such terms as *mind, psyche, self, muse,* or even pronouns like *I, me,* and *you.*

As part of the organizational structure of the independent natural science of behavior, *The International Behaviorology Institute* (TIBI), a non–profit organization, exists (a) to arrange professional activities for behaviorologists and supportive others, and (b) to focus behaviorological philosophy and science on a broad range of cultural concerns. And *Behaviorology Today* is the referred journal of the Institute. Journal authors write on the full range of disciplinary topics including history, philosophy, concepts, principles, and experimental and applied research. Join us and support bringing the benefits of behaviorology to humanity. (Contributions to TIBI or TIBIA—the professional organization arm of TIBI—are tax–deductible.)

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