



# The Therapeutic Thematic Arts Programming (TTAP) Method® in Aging and Cognitive Impairment: A Neurocognitive and Psychosocial Framework for Caregiver-Guided Intervention

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## Keywords

Mild Cognitive Impairment; Dementia; Neuroplasticity; Cognitive Reserve; Arts-Based Intervention; TTAP Method®, Multimodal Therapy; Art Therapy; Caregiver Burden

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## Abstract

**Background:** The increasing prevalence of mild cognitive impairment (MCI) and dementia has intensified interest in nonpharmacological interventions that may enhance cognitive resilience and quality of life. While cognitive training and digital interventions are well represented in the literature, structured multimodal arts-based interventions remain underexamined in neuroscience-focused journals.

**Objective:** To synthesize peer-reviewed evidence (2015–2025) on structured nonpharmacological interventions for cognitive impairment and introduce the Therapeutic Thematic Arts Programming (TTAP®) model as a theoretically grounded multimodal framework aligned with contemporary neuroscience.

**Methods:** Narrative review of peer-reviewed literature examining cognitive training, multisensory stimulation, reminiscence therapy, dyadic caregiver interventions, and structured activity programming in older adults with MCI or dementia.

**Results:** Evidence strongly suggests multimodal structured engagement may positively influence mood regulation, behavioral symptoms, caregiver burden, and possibly cognitive maintenance. Mechanisms include activation of neuroplastic pathways, autobiographical memory networks, limbic–prefrontal integration, and social cognition circuits.

**Conclusion:** Structured arts-based multimodal interventions warrant rigorous empirical investigation. TTAP® provides a conceptual framework consistent with current neurobiological models of cognitive reserve and multisensory engagement.

## Introduction

Today, 2026 it is estimated that there are over 40 million caregivers in the United States and it is estimated that the global burden of dementia is projected to more than double by 2050 [1]. Pharmacologic therapies offer modest symptomatic benefit but limited disease-modifying effects [2]. Consequently, attention has shifted toward nonpharmacological strategies targeting modifiable risk factors and cognitive reserve [3].

Emerging research demonstrates that neuroplasticity persists into late adulthood [4]. Cognitive reserve theory suggests that engagement in intellectually and socially stimulating activities enhances resilience against neuropathology [5,6]. Despite growth in computerized cognitive training research, multimodal approach that stimulates arts-based structured interventions remain underrepresented in, neuroscience literature. Multimodal approach is defined as any activity that stimulates emotional, social, physical, and sensorial aspects of the individual.

This review synthesizes recent evidence and proposes a conceptual framework for the Therapeutic Thematic Arts Programming (TTAP®) model within contemporary neurobiological theory.

## Neurobiological foundations

### Neuroplasticity in Aging

### Neurocognitive Mechanisms Underlying Observed Outcomes

The consistency of findings across United States and Finnish TTAP implementations suggests that observed benefits are supported by identifiable neurocognitive mechanisms rather than purely psychosocial effects. Contemporary models conceptualize dementia as large-scale neural network disruption, particularly affecting hippocampal–cortical systems, default mode connectivity, and frontoparietal control networks [3,4]. Interventions that engage preserved neural systems while compensating for compromised episodic memory may therefore offer functional benefits. The TTAP Method®

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appears to activate multiple distributed pathways that remain relatively intact in mild-to-moderate neurocognitive disorders.

### **Procedural Memory Preservation and Corticosteroid Circuitry**

A consistent finding in Alzheimer's disease is the relative preservation of procedural memory in early and moderate stages despite progressive hippocampal degeneration [18]. Procedural memory depends primarily on corticosteroid loops involving the basal ganglia, supplementary motor area, premotor cortex, and cerebellum, rather than medial temporal lobe structures [18].

TTAP sessions incorporate repetitive motoric components—brush strokes, patterned design sequences, rhythmic tapping, guided gesture-based movements—that rely on implicit motor learning pathways. These tasks reduce dependence on declarative memory and instead engage striatal-based habit systems.

Neurocognitive models of cognitive reserve propose that recruitment of preserved networks may compensate for deficits in damaged regions [4,5]. By structuring sessions around predictable, repeated artistic actions, TTAP leverages intact procedural systems, supporting task initiation and sustained engagement without overwhelming compromised episodic memory processes. The TTAP® approach is to stimulate long term memory for participation in person centered activities which naturally increase verbal language and social interactions along with brain stimulation.

This mechanism may partially explain the observed increases in participation and reduced apathy reported in arts-based dementia interventions [10,11].

### **Multisensory Cortical Activation and Network Integration**

Dementia involves disruption of distributed cortical networks, including the default mode network (DMN) and frontoparietal executive systems [3]. Multimodal stimulation has been associated with increased cortical recruitment and enhanced neural integration in aging populations [6,7].

TTAP® integrates visual, auditory, tactile, and motor stimulation within a single session. Visual art activates occipital and parietal cortices; music stimulates bilateral temporal regions and auditory association areas; movement engages motor and premotor systems; and social dialogue activates frontal and temporal social cognition networks. All of the written work from the author associates the exact regions of the brain being stimulated during any theme focused activity [8,9].

Environmental enrichment research demonstrates that aging brains retain capacity for synaptic remodeling and adaptive compensation [4]. Environmental enrichment and structured engagement may promote functional network efficiency [7].

### **Cognitive Reserve**

Cognitive reserve reflects adaptive neural processes that buffer against pathology [5]. Lifestyle engagement, social interaction, and novel learning contribute to reserve capacity [6].

### **Emotional Salience and Autobiographical Memory**

Autobiographical memory activates medial temporal and default mode networks [8,9,10,11]. Emotional salience enhances encoding through limbic-hippocampal interactions [7].

### **Multisensory Integration and Social Cognition**

Multimodal stimulation activates distributed neural networks, including prefrontal executive systems, hippocampal memory circuits, amygdala-based emotional processing, and temporoparietal social cognition networks [10–12]. Such

distributed activation may enhance compensatory recruitment in early cognitive decline.

## **Review of Nonpharmacological Interventions (2015–2025)**

### **Computerized Cognitive Training**

Meta-analyses report small-to-moderate improvements in domain-specific cognitive performance in MCI populations [13,15]. Generalization to functional outcomes remains inconsistent [14].

### **Structured Activity Programming**

Tailored activity interventions reduce behavioral symptoms and caregiver distress [16,17]. Structured engagement enhances affect regulation and participation [18].

### **Dyadic Caregiver Interventions**

Dyadic interventions improve communication patterns and caregiver self-efficacy [19,20]. Caregiver burden is significantly associated with behavioral symptom severity [21].

### **Arts-Based and Reminiscence Interventions**

Music-based interventions improve mood and engagement [22]. Reminiscence therapy demonstrates psychosocial benefits [24]. Visual arts participation enhances social interaction and quality of life [25,26].

Collectively, evidence suggests emotionally meaningful, socially interactive, and multimodal interventions may produce broader psychosocial benefits than isolated cognitive drills.

### **The TTAP® framework**

The Therapeutic Thematic Arts Programming (TTAP®) model is a structured, theme-based multimodal engagement framework integrating visual arts, music, guided reminiscence, movement, dialogue, and sensory stimulation. Most importantly the participant interacts and learns through seeing, hearing and doing. This establishes true self-esteem and cognitive awareness [9].

1. Thematic sequencing anchored in culturally meaningful contexts (Example; tell us where you were born, what country, what cultural aspects)
2. Multisensory task integration (Example; starting with meditation person moves into painting or drawing what they saw in their “minds eye”.)
3. Guided autobiographical recall (Example; Lets look at all these images of childhood -images of photographs are spread on tabletop. Person is asked to choose image that speaks to you and describe why)
4. Group-based social interaction (Example; Lets choose a theme of TRAVEL, “where have you traveled to?”) Seemingly simple, these verbal personal interactions allow the participant to learn, think, and share faster with a strong sense of self-esteem.
5. Strength-based adaptation (It is well known that long term memory outlasts short term memory throughout the cognitive disease process. The TTAP Method® consistently frames all interactions around the past, present and future. Thus, stimulating and creating stronger more integrated memories [8,9].)

### **Conceptual Neurobiological Alignment**

TTAP® is hypothesized to:

- Engage hippocampal memory circuits via reminiscence [39]
- Activate executive networks through structured creative tasks [40]
- Stimulate limbic reward pathways [40]
- Enhance social cognition network engagement [38]
- Reduce stress physiology via relaxation components [31]

Preliminary pilot observations suggest mood enhancement and increased engagement; however, controlled trials remain limited. Over 100 individual case studies conducted through St. Thomas Aquinas College Research curriculum from 2009-2025, demonstrate significant improvement in mood, memory, socialization, and cognition. These findings are all self-reported and published in the St. Thomas Aquinas IGNITE Research colloquium [9,43].

### Translational Application in Caregiving

Structured caregiver-mediated engagement may enhance self-efficacy [19] and reduce burden [21,34]. Translation of multimodal intervention principles into caregiver-accessible strategies represents an important step in community dementia care dissemination [32,34,35]. In 2025, statistics point to a great percentage of caregivers have no education in the area of healthcare, thus leaving them with feelings of frustration, impatience, stress and high levels of agitation [36,43]. The structured and replicable approach that the TTAP Method® is founded upon elevates these issues [38,41]. The caregiver can choose a meditation to listen to (given in the book) and then read how to move into a drawing session utilizing what the client saw or emotionally felt during the meditation [37,44]. *The Caregiver Workbook* allows the caregiver to document exactly what was verbally shared during each session [38,44].

### Future Empirical Directions

To evaluate efficacy, future studies should include:

#### Randomized Controlled Trials

Comparison of TTAP® with standard activity programming and computerized cognitive training.

#### Neurobiological Measures

- Resting-state fMRI connectivity
- EEG coherence patterns [30]
- Brain-derived neurotrophic factor (BDNF) levels [28]
- Salivary cortisol [29]

#### Functional Measures

- Montreal Cognitive Assessment (MoCA) [31]
- Neuropsychiatric Inventory (NPI) [32]
- Caregiver Burden Inventory [33]
- Quality of Life in Alzheimer's Disease scale [34,39]

Longitudinal follow-up at 6 and 12 months is recommended.

### Limitations

This review is narrative rather than systematic. Evidence specific to TTAP® remains preliminary. Arts-based interventions present methodological challenges regarding standardization and time in programming control.

### Conclusion

Multimodal arts-based structured interventions represent a theoretically coherent adjunct in dementia care [41,43].

The TTAP® framework aligns with contemporary models of neuroplasticity, cognitive reserve, and multisensory engagement. Rigorous empirical investigation is warranted to establish efficacy and neural mechanisms [39,40, 42].

### Author Note

The author also notes the recent publication of *Caregiving for Adults with Cognitive Impairments and the accompanying Workbook for Caregivers*, currently available in five languages. More information can be found at: [www.TTAPmethod.com](http://www.TTAPmethod.com)

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