



MEMORY, FORGETTING, & ART



PRESERVING PERSONHOOD THROUGH ARTISTIC EXPRESSION

39th Annual Alzheimer's Disease Management & Research Symposium

Alzheimer's Tennessee

Daniel C. Potts, MD, FAAN

Tuscaloosa VA, The University of Alabama, Cognitive Dynamics Foundation

©Daniel C. Potts, MD, FAAN

DISCLOSURES



Art created in BATL

- Dr. Potts has received publishing royalties from publications relating to health care (minimal royalties for published books about dementia care giving, poetry related to care giving, etc.). The following book titles are relevant to this disclosure: *A Pocket Guide for the Alzheimer's Caregiver*, *Finding Joy in Alzheimer's*, *Treasure for Alzheimer's*, *A Heart that Knows Your Name*, and *Bringing Art to Life*.
- Dr. Potts has a non-compensated relationship as President with Cognitive Dynamics Foundation (non-profit) that is relevant to this presentation.

©Daniel C. Potts, MD, FAAN

OBJECTIVES



- Discuss the neuroscience of memory
- Describe changes in memory associated with Alzheimer's disease
- Elucidate the stigma associated with memory loss, Pillars of Personhood, and the bolstering of personhood through creativity, narrative, and supportive relationships
- Explore artistic engagement for persons living with Alzheimer's and other dementias and creativity's effects on memory, personhood and narrative, highlighting the role of art therapy
- Identify autobiographical memory elements present in representative dementia art
- Highlight an art therapy program developed to enhance quality of life in persons living with dementia, to illicit and preserve life stories, and to build intergenerational relationships

©Daniel C. Potts, MD, FAAN

MEMORY, FORGETTING, & ART



- **Memory:** Learning: the process of acquiring new information, the outcome of which is memory (Gazzaniga, M. S., et al, 2019)
- **Forgetting:** "It is through the erosion of memory that time heals all wounds."—Lisa Genova
- **Art:** "Art is an appeal against vanishing."—Lynn Casteel Harper



Art by Lester E. Potts, Jr.,
an artist who had Alzheimer's

©Daniel C. Potts, MD, FAAN

TYPES OF MEMORY (GAZZANIGA, M. S., ET AL, 2019)



- **Very brief sensory memory** - milliseconds - seconds
- **Short-term/working memory** (short-term information retention and capacity for performing mental operations on the content) - seconds - minutes
- **Long-term memory** – years - decades
 - **Declarative memory (explicit)** - conscious memory for learned facts (**semantic**) and experienced events (**episodic**); consciously accessed; verbally reported
 - **Nondeclarative memory (implicit)** - nonconscious memory that cannot be verbally reported, often expressed through the performing of procedures (**procedural**)

©Daniel C. Potts, MD, FAAN

HOW ARE MEMORIES MADE? (GENOVA, L., 2021)



- **Encoding** - Sights, sounds, information, emotion, meaning of what has been perceived/paid attention to; translated into neural activity
- **Consolidation** – The brain weaves unrelated collections of neural activity into a single web of connections.
- **Storage** - Pattern of activity is maintained through persistent structural/chemical changes in neurons
- **Retrieval** – Connections of learned/experienced information can be reactivated, recalled, & recognized.

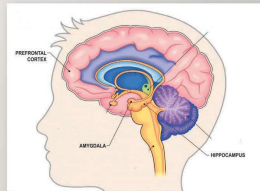
©Daniel C. Potts, MD, FAAN

PRIMARY BRAIN REGIONS FOR MEMORY

(GAZZANIGA, M. S., ET AL, 2019; GENOVA, L., 2021)



- **Hippocampus** ("memory weaver," or "save button")
 - Weaves who/what/where/when/why into a retrievable unit of associated data (memory)
 - Activates regions destined for long-term memory until rewiring produces a stable, connected pattern
 - Involved in spatial navigational learning
- **Pre-frontal cortex** (present moment)
 - Working memory – limited space for sights, sounds, smells, tastes, language, emotions
 - Holds 7 +/- 2 items for 15 to 30 seconds
- **Amygdala** (emotions, especially fear)
 - Activated by emotion/surprise
 - Alerts hippocampus to consolidate important incoming data into memory



©Daniel C. Potts, MD, FAAN

MORE ON MEMORY

(GAZZANIGA, M. S., ET AL, 2019; GENOVA, L., 2021)



- **Meaning matters for memory**—interesting, meaningful, new, surprising, significant, emotional, consequential
- Storage occurs in the **same neural pattern** that was stimulated when first experienced.
- **Perception/attention** are essential for the process of remembering.
- **Hippocampus saves/consolidates** significant items from working memory to form long-term memories.
- **Autobiographical memory**—life story made up of most meaningful episodic memories
- **Reminiscence bump**—important episodic memories from ages 15 - 30

©Daniel C. Potts, MD, FAAN

MORE ON MEMORY

(GAZZANIGA, M. S., ET AL, 2019; GENOVA, L., 2021)



- **Relational memory**—memory for relations among elements of an experience
- Representations of an event distributed throughout the cortex come together in the mesial temporal lobe, where the **hippocampus binds them**.
- **Consolidation**: repeated activation of memory creates connections (**No longer requires the hippocampus**)
- **Context**, external/internal, becomes part of memory; **activation of any part can trigger retrieval of others**
- **Remembering is reactivating, reconsolidating, rewriting, resaving (re-contextualizing the story)**

©Daniel C. Potts, MD, FAAN

MORE ON MEMORY

(GAZZANIGA, M. S., ET AL, 2019; GENOVA, L., 2021)



- Rehearsal, self-testing, visuospatial imagery, mnemonics, surprise, emotion, meaning improve memory.
- **Sleep saves newly-encoded memories.**
- 2 primary ways to resist effects of time: **repetition/meaning**
- Recalling life's most meaningful details (**autobiographical memory**) bolsters **sense of self, narrative, growth/relationships** with others.
- **Expressive arts/creativity access and bolster autobiographical memory.**

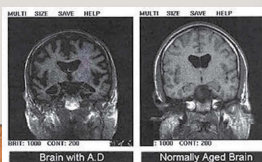
©Daniel C. Potts, MD, FAAN

ALZHEIMER'S-ASSOCIATED MEMORY CHANGES

(WEINTRAUB, S., ET AL, 2012)



- Earliest - **episodic memory decline** due to ineffective consolidation/storage (hippocampal damage)
 - Next - **semantic memory**—object naming, verbal fluency and semantic categorization decreases
 - **Working memory decline** comes later.
 - The extent of **atrophy** in the mesial temporal lobe correlates to deficits in episodic memory.
- Why is the loss of memory so stigmatizing? Does one's memory loss make one less of a person?*



©Daniel C. Potts, MD, FAAN

STIGMA /'STIGMƏ/

The disapproval of, or discrimination against, a person based on perceivable characteristics that serve to distinguish them from other members of a society.

What is the root cause of the stigma associated with Alzheimer's and other dementias?

©Daniel C. Potts, MD, FAAN

THE ROOT CAUSE OF STIGMA?

- The belief, perhaps unacknowledged, that people living with dementia **somehow embody less personhood** than others who don't have dementia, **simply because they are losing memory** and other cognitive functions.
- That the diagnosis of dementia somehow renders one less a person than before receiving the diagnosis, as if personhood could be diminished by any circumstance or condition at all.

©Daniel C. Potts, MD, FAAN

WHAT IS PERSONHOOD AND HOW IS IT AFFECTED BY DEMENTIA?

"IT MAY NOT BE DYING WE FEAR SO MUCH, BUT THE DIMINISHED SELF."
- ANATOLE BROYARD



©Daniel C. Potts, MD, FAAN

DEFINITIONS OF PERSONHOOD



©Daniel C. Potts, MD, FAAN

PERSONHOOD

- Is imparted
- Cannot be gained or lost
- Is not earned
- Is sacred and carries inherent dignity
- Is not dependent on productivity, morals, or *cognitive ability*

©Daniel C. Potts, MD, FAAN

PERSONHOOD

- This concept of personhood has profound implications for the way we, both as individuals and as a society, regard persons living with dementia.
- It should call forth our finest and most compassionate efforts as care partners.
- It means that we never give up on persons living with dementia, no matter how far the progression, severe the disease, misunderstood the behavior, etc.
- There are no human "shells."

©Daniel C. Potts, MD, FAAN

THE MORAL IMPERATIVE OF MEMORY LOSS

Does one have to possess an intact memory to be considered a person?

"If I am forgetting you, does that make me less than me?"

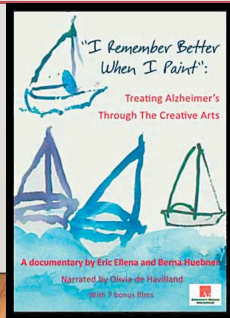
What is the moral imperative of care partners, both lay and professional, in this situation?



©Daniel C. Potts, MD, FAAN

"I REMEMBER BETTER WHEN I PAINT."

--HILDA GOLDBLATT GORENSTEIN



©Daniel C. Potts, MD, FAAN

"Creativity is seen as leading to well-being by helping us articulate a story about who we are (coherence), exercise a purpose, and demonstrating the significance or value of our lives ... Creativity can also help us build a legacy, something that can live beyond us and that can reduce the stress, anxiety, or at the very least the unsettledness we can feel when we face mortality."

—ANNE BASTING



©Daniel C. Potts, MD, FAAN

ART and PERSONHOOD

"No day shall erase you from the memory of time."—Virgil



©Daniel C. Potts, MD, FAAN

BRAIN BENEFITS OF ART

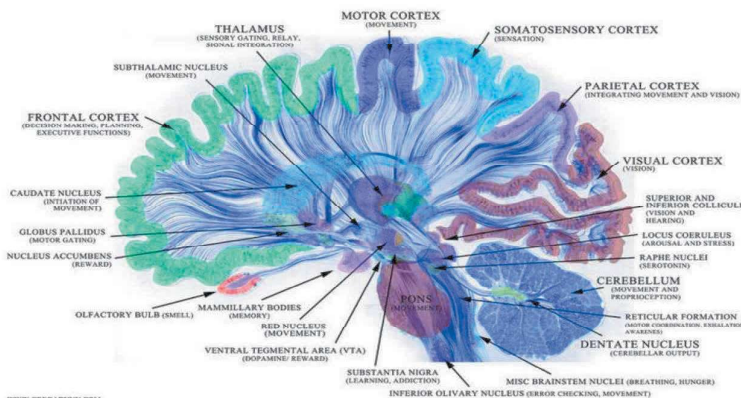
(WWW.NPR.ORG/SECTIONS/HEALTH-SHOTS/2020/01/11/795010044/FEELING-ARTSY-HERES-HOW-MAKING-ART-HELPS-YOUR-BRAIN)



"Creativity is chocolate for the brain"—Gene Cohen, MD

- Facilitates the development/preservation of **visuospatial** and fine motor skills
- Increases one's ability to create **abstractions** and process concepts in abstract
- Helps to lessen brain effects of **stress**
- Helps to preserve **patience, attention** and **self-regulation**
- Makes **connections** between unrelated things and fosters **communication**
- Activates the **reward (pleasure)** centers of the brain
- Engenders a **flow state**, associated with a sense of **well-being**

©Daniel C. Potts, MD, FAAN



WWW.GREGADUNN.COM

Brain structures involved in artistic engagement

©Daniel C. Potts, MD, FAAN

ARTISTIC ENGAGEMENT IN DEMENTIA (ZEISEL, J., 2009)



- Artistic engagement can provide **meaning** for persons living w/dementia.
- Art connects people to their **culture** and **community**.
- Alzheimer's/dementia brings an **openness to art** that is realized through artistic engagement. (**Short-term memory is not a requirement for meaningful engagement.**)
- "The expressive arts engage the brain in a more profound way than most other activities," **linking separate brain locations** in which memories and skills lie, **bypassing single-location deficits**.
- **Dementia does not seem to dampen the desire to create.**

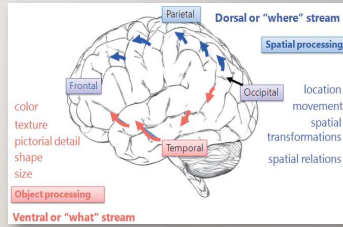
©Daniel C. Potts, MD, FAAN

VIEWING, PROCESSING, CREATING VISUAL ART

"Art is about meaning, as understood through its social and historical context."—(Chatterjee, A., 2014)



- **Occipital/parietal lobes** register/attend to visual stimuli. **Temporal lobes** provide meaning. Actions in response to art come primarily from the **frontal lobes**.
- The visual system processes different elements in 2 streams:
 - **Dorsal stream ("where")**
 - **Ventral stream ("what")**



(<https://www.nmr.mgh.harvard.edu/mkzhevlab/?tag=visualization-processes>)

©Daniel C. Potts, MD, FAAN

VIEWING, PROCESSING, CREATING VISUAL ART

(MENDEZ, M. F., 2004; ROSE, F. C., 2007)



"When you observe...art you are potentially **firing the same neurons as the artist did when they created it**."
— Jacob Devane, Natural Blaze website

Separate visual features → **occipital lobe**

Visuospatial organization → **parietal lobe** (dorsal stream)

Meaningful scene organization → **right temporal lobe** (ventral stream)

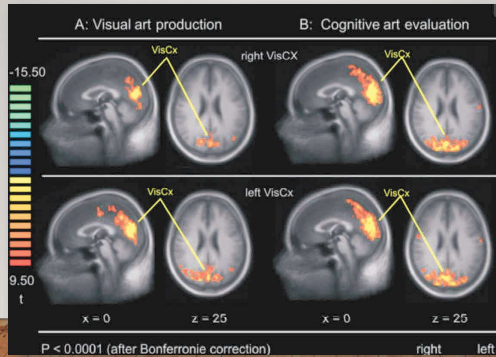
The ventral stream forms idealized prototypes (recognition network).

- The intuitive artistic sense is in the right hemisphere.
- The right hemisphere **lives in the moment** of the experience.
- The left hemisphere **analyzes/interprets** the experience linguistically.

©Daniel C. Potts, MD, FAAN

VIEWING, PROCESSING, CREATING VISUAL ART

(BOLWERK, A., ET AL, 2014)



©Daniel C. Potts, MD, FAAN

ART, MEMORY, SELFHOOD, & NARRATIVE

A PHILOSOPHICAL APPROACH (AUMANN, A., 2019)



According to philosopher, Søren Kierkegaard:

- The true self is discovered by **turning inward**.
- Humans seek **coherence**: alignment of past and future.
- **The self is a work of art** (a story) to be shaped; life narrative/story determines identity. **Inner unity** is required to make sense of life narrative/story. **Art and creativity help to provide that unity**.
- Art matters primarily because it **assists with the "project of selfhood,"** the shaping of life narrative/story.
- Art offers lenses through which to more clearly see selves and the world. **Art is a mirror** for life.

This function of art may be particularly important in persons living with Alzheimer's and other dementias.

©Daniel C. Potts, MD, FAAN

ART, MEMORY, SELFHOOD & NARRATIVE

THE ROLE OF ART THERAPY

(ABRAHAM, R., 2005; HASS-COHEN, N., FINDLAY, J. C., 2015)



Art Therapy—integrative mental health/human services profession that enriches lives/communities through active art-making, creative process, applied psychological theory, and human experience within a psychotherapeutic relationship...
—(American Art Therapy Association, 2021)

- Art therapy supports **meaning** and bypasses verbal aspects of brain function, aiding in communication.
- Art therapy can provide a means of **expressing emotions**, bolstering **self-image**.
- The novel, positive aspects of art can excite the formation/updating of **autobiographical memory**.
- Art making, associated with parietal, temporal, limbic and right hemisphere functions, **synthesizes and integrates psychological/emotional/cognitive functions**.

©Daniel C. Potts, MD, FAAN

ART, MEMORY, SELFHOOD & NARRATIVE

THE ROLE OF ART THERAPY

(ABRAHAM, R., 2005; HASS-COHEN, N., FINDLAY, J. C., 2015)



- Art therapy likely promotes **neuroplasticity** in brain regions that contribute to psychological **wellbeing**. Brain plasticity, through learned happiness/compassion, builds **resiliency**.
- Art therapy, including its relational aspects, can activate and mend **attachment wounds**, helping to limit **emotional reactivity**, stabilize **affect** and update/rewrite **autobiographical memory**.
- Art therapy can facilitate creation of a new **meaningful narrative** involving negative or traumatic memories, resulting in a **transformed sense of self** and renewed autobiographical memory.

©Daniel C. Potts, MD, FAAN

ART, MEMORY, SELFHOOD & NARRATIVE

THE ROLE OF ART THERAPY
(ABRAHAM, R., 2005; HASS-COHEN, N., FINDLAY, J. C., 2015)



"The process transforms the space and canvas into symbolic self-spaces. Art reveals the interior space of the artist."

- R hemisphere holds nonverbal autobiographical memories; the L integrates them with a verbal story.
- **R hemisphere holds the social-emotional self**, & orbitofrontal structures integral to the **interpersonal sense of self**. Image-making may directly access this area of the brain. **Brain regions associated with the social-emotional self are less adversely affected by Alzheimer's pathology.**
- **Music and color/sensory stimuli** can provide a gateway to the R hemisphere. Color and **movement** in painting can inspire personal insights.
- "Adding color, associated with expression of emotion, to pencil drawings helps integrate cognitive and emotional brain centers while consolidating a more expressive understanding of the self."

©Daniel C. Potts, MD, FAAN

ART, MEMORY, SELFHOOD & NARRATIVE

THE ROLE OF ART THERAPY
(ABRAHAM, R., 2005; HASS-COHEN, N., FINDLAY, J. C., 2015)



"You must know that there is nothing higher and stronger and more wholesome for life in the future than some good memory, especially a memory of childhood, of home."—Fyodor Dostoyevsky

- Recollection of early memories is associated with aspects of wellbeing (**self-esteem/self-control**).
- Memories from childhood/adolescence may present as **stand-alone visual images/stories**.
- Meaning is made by linking memories to the way the self is currently understood (**compassionate listener**) (**compassionate "container"**) (**memory keeper**).
- The **default mode network (DMN)** engenders wandering thoughts (~meditation), associated with creativity, and has been associated with psychological resiliency. Oscillation between frontal left-brain areas & DMN in the temporoparietal lobes likely forms the **foundation of creativity**.

©Daniel C. Potts, MD, FAAN

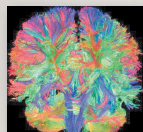
ART, MEMORY, SELFHOOD & NARRATIVE

THE ROLE OF ART THERAPY
(ABRAHAM, R., 2005; HASS-COHEN, N., FINDLAY, J. C., 2015)



"Persons w/dementia have an interior, subjective world. Persons w/dementia, overwhelmed by loss of verbal skills, can give voice to this inner world through art."—Ruth Abraham

- **When disability limits language, images become significant** both as a means to communicate emotional material and as a means to heal.
- L ant. temporal lobe degeneration enhances critical R hemisphere functions causing heightened activity.



©Daniel C. Potts, MD, FAAN

ART, MEMORY, SELFHOOD & NARRATIVE

"All paths lead to the same goal: to convey to others what we are."—Pablo Neruda



Illustration by Geoff McFenidge

©Daniel C. Potts, MD, FAAN

"There is no greater agony
than bearing an untold story
inside you."

- Maya Angelou

©Daniel C. Potts, MD, FAAN

STORY

"**Owning our story**

and **loving ourselves**

through that process

is the **bravest thing**

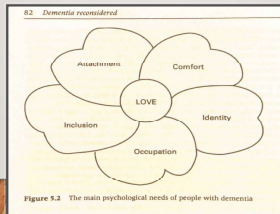
that we will ever do."

-Brene' Brown

©Daniel C. Potts, MD, FAAN

WE CAN HELP THEM OWN THEIR STORY... THOMAS KITWOOD'S PHILOSOPHY

- Dementia is best understood as an interplay between neurological impairment and psychological factors (especially the social context of the environment of care).
- Persons living with dementia exist in a state of relative well-being or ill-being, based on not only neuropathology but also the degree to which the following needs are met in an affirming social context (personhood is in part maintained through relationships):



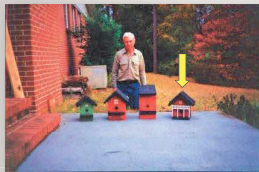
©Daniel C. Potts, MD, FAAN

PRACTICE RECOMMENDATIONS FOR PERSON-CENTERED CARE

FAZIO, ET AL

- Know the person living with dementia.
- Recognize and accept the person's reality.
- Identify and support ongoing opportunities for meaningful engagement.
- Build and nurture authentic, caring relationships.
- Create and maintain a supportive community for individuals, families and staff.
- Evaluate care practices regularly and make appropriate changes.

©Daniel C. Potts, MD, FAAN



"Visual art will reflect its maker."—Ruth Abraham

BIRDHOUSES



©Daniel C. Potts, MD, FAAN

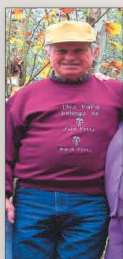


FENCES

©Daniel C. Potts, MD, FAAN

BROTHERS FROM SAWMILLING DAYS

A life-long friendship was forged of sinews, sweat and sawdust between
Lester and Albert Corder, seen here in both life and art.

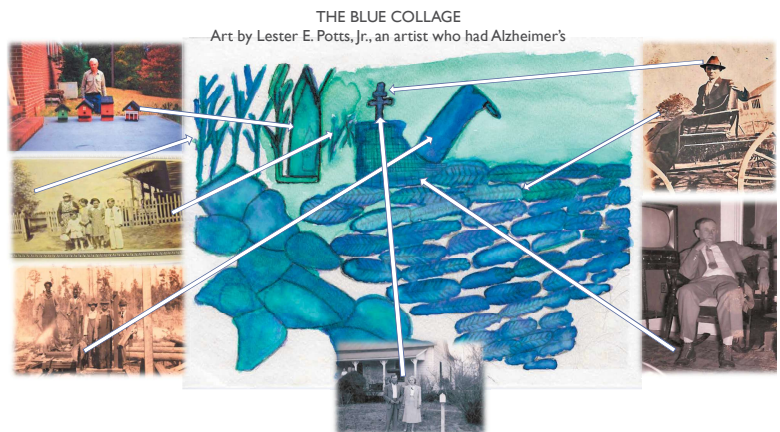


©Daniel C. Potts, MD, FAAN

LESTER AND ALBERT

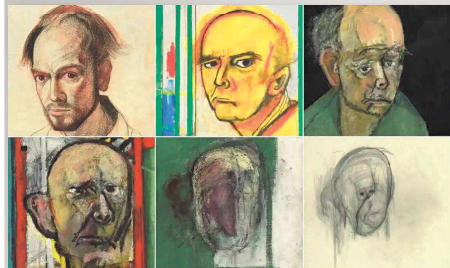


©Daniel C. Potts, MD, FAAN



ARTISTIC ANALYSIS: WILLIAM UTERMÖHLEN & LESTER POTTS

(Van Buren, B. Bromberger, B., et al. *Changes in Painting Styles of Two Artists with Alzheimer's Disease*. *Psychology of Aesthetics, Creativity, and the Arts*. 2013 American Psychological Association 7 (1):89-94.)



A. Details from William Utermöhlen's self-portraits, the first, made in 1967, the rest from 1996 the year following his diagnosis of Alzheimer's disease, to 2000, charting his decline. Photograph: Images courtesy of the artist's estate and GVArt Gallery, London



Paintings of both artists (w/disease progression)

- became more abstract and more symbolic
- displayed less precision & attention to spatial relationships
- were less depictively accurate & less realistic

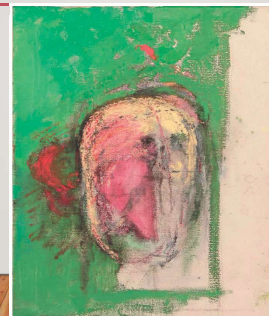
Paintings of Lester Potts showed (w/disease progression)

- more color saturation
- warmer hues
- less complexity
- less emotion

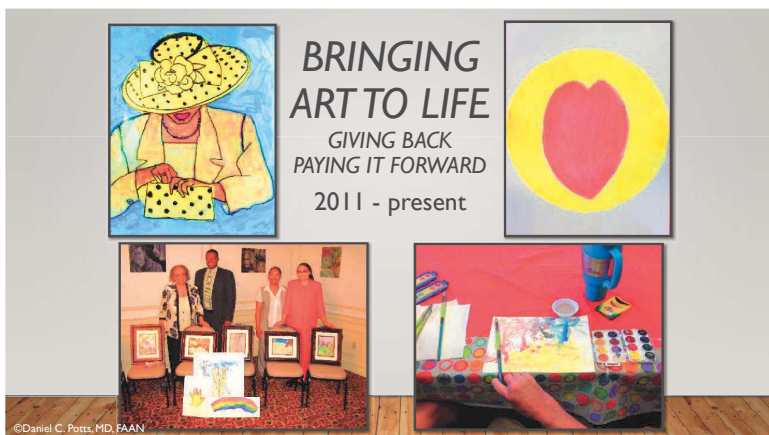
©Daniel C. Potts, MD, FAAN

IN AN ESSAY ON HER LATE HUSBAND'S LAST WORKS, PATRICIA UTERMÖHLEN WROTE THAT THE SELF-PORTRAITS WERE A WAY OF "ADDRESSING HIS FEARS AND EXPLORING HIS ALTERED SELF," "NECESSITATING A NEW FORM, NEW TOOLS, EVEN A NEW STYLE." "THE GREAT TALENT REMAINS, BUT THE METHOD CHANGES."

—(URQUHART, E. (2020))



©Daniel C. Potts, MD, FAAN



BRINGING ART TO LIFE



Bringing Art to Life (BATL) is a service-learning program for students & persons living w/dementia (PWD) in which **intergenerational relationships** are fostered through **art therapy & narrative**.

©Daniel C. Potts, MD, FAAN

EDUCATIONAL & TRAINING ELEMENTS OF BATL



- **Neuroscience** of memory & common types of dementia, including research updates on emerging diagnostic and treatment paradigms
- **Virtual Reality** training on the lived experience of dementia
- **Person-centered care & communication** techniques
- **Care giving & impact** of dementia on family systems
- **Art therapy & other expressive arts therapies** and their use in dementia care
- **Mindfulness**, present moment centeredness, self-discovery & cultivating **gratitude**

©Daniel C. Potts, MD, FAAN

BRINGING ART TO LIFE RESEARCH SUMMARY

KEISHA CARDEN, CANDICE REEL, DR. REBECCA ALLEN,
ALABAMA RESEARCH INSTITUTE ON AGING

- Students show **increased empathy and improved attitudes toward older adults and persons living with dementia**
- **Existential awareness** fosters **mindfulness and empathy** that subsequently facilitates change in ageist attitudes
- **Engagement with the present moment** with other group members versus meaningful engagement with art was a more powerful predictor of relationship building, conversations regarding purpose-and meaning-in-life, and subsequent shifts in ageist attitudes
- Total engagements were significantly higher in **morning sessions** than in afternoon sessions
- Two emergent themes within the verbal engagements were identified: **validation of personhood** and **reminiscence of family ties**

©Daniel C. Potts, MD, FAAN

Bringing Art to Life Chicago (w/Chicago Methodist Senior Services)



BATL Chicago sensory garden & end-of-semester gathering

©Daniel C. Potts, MD, FAAN

Bringing Art to Life Birmingham (w/Birmingham-Southern College & McCoy Adult Daycare)



©Daniel C. Potts, MD, FAAN

Bringing Art to Life Relationships

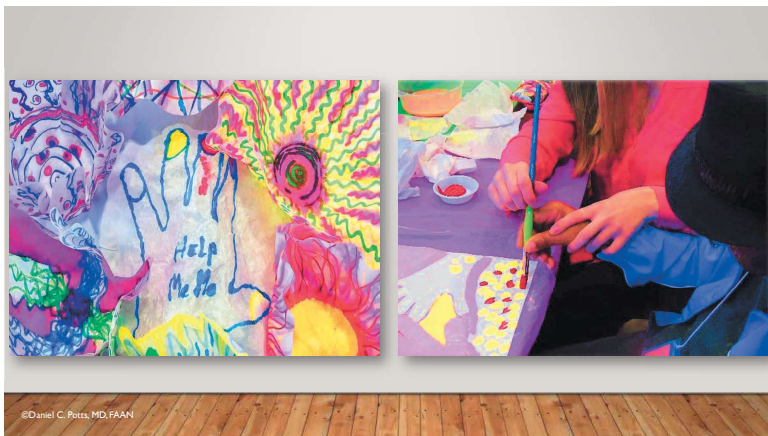


©Daniel C. Potts, MD, FAAN

Bringing Art to Life Art



©Daniel C. Potts, MD, FAAN



"From mirror after mirror no vanity is displayed;
I'm looking for the face I had
before the world was made."
-William Butler Yeats

Dear World, If I forget,
please show me back to me.
@DanielPotts

"We are not
human beings
having a spiritual
experience.
We are
spiritual beings
having a
human experience"
Teilhard de Chardin

©Daniel C. Potts, MD, FAAN



SUMMARY

- The neuroscience of memory reveals a complex, multimodal, multipathway, neuroplastic system which integrates diverse brain regions and promotes not only human surviving and thriving, but also the expression of selfhood and the making of meaning in personal, social and cultural contexts.
- Memory changes associated with Alzheimer's disease include progressive declines, first, in episodic, then semantic and working memory.
- For persons living with Alzheimer's and other dementias, the making of meaning, the bolstering of selfhood, the expression of emotions, the facilitation of communication, the recollection of narrative, the generation of mindfulness and flow, and the preservation of relationships are among the most important effects of engagement in art and creativity.
- Expressive arts programs can foster creativity, tap autobiographical memory, grow empathy, bolster personhood, build relationships and increase self-awareness in other individuals and in the human community at large.

©Daniel C. Potts, MD, FAAN

SOURCES

1. Abraham, R. (2005). *When Words Have Lost Their Meaning*. Praeger.
2. Aumann, A. (2019). *Art and Selfhood*. Lexington Books.
3. Basting, A. D. (2020). *Creative Care*. Harper One.
4. Bolwerk, J. et al. How Art Changes Your Brain: Differential Effects of Visual Art Production and Cognitive Art Evaluation on Functional Brain Connectivity. 2014 PLoS ONE 9(12): e116548. doi:10.1371/journal.pone.0116548
5. Chatterjee, A. 2014. *The Aesthetic Brain*. Oxford University Press.
6. Crutch S. J. et al. Some Workmen Can Blame Their Tools: Artistic Change in an Individual with Alzheimer's. *Lancet*. 2001 Jun 30;357(9274):2129-33.
7. Gazzaniga, M. S., et al. (2019). *Cognitive Neuroscience: The Biology of the Mind*. W.W. Norton & Company.
8. Genova, L. (2021). *Remember: The Science of Memory and the Art of Forgetting*. Harmony Books.
9. Hass-Cohen, N., Findlay, J. C. (2015). *Art Therapy and the Neuroscience of Relationships, Creativity and Resiliency*. W.W. Norton & Company.
10. Hogue, D. A. (2003). *Remembering the Future-Imagining the Past*. WIPF & Stock.
11. Iyengar, S. How Creativity Works in the Brain: Insights from a Santa Fe Institute Working Group. *National Endowment for the Arts*. 2015 July:1-43.
12. King, J., Kaimal, G. Approaches to Research in Art Therapy Using Imaging Technologies. 2019 *Front Hum Neurosci* 13:159
13. Mendez, M. F. Dementia as a window to the neurology of art. 2004 *Medical Hypotheses* 63 (1):1-7.
14. Rose, F. C. (2007). *Neurology of the Arts*. Imperial College Press.
15. Urquhart, E. (2020). *The Age of Creativity: Art, Memory, My Father and Me*. House of Anansi Press, Inc.
16. Van Buren, B., Bromberger, B., et al. Changes in Painting Styles of Two Artists with Alzheimer's Disease. *Psychology of Aesthetics, Creativity and the Arts*. 2013 *American Psychological Association* 7 (1):89-94.
17. www.npr.org/sections/health-shots/2020/01/11/795010044/feeling-artsy-heres-how-making-art-helps-your-brain
18. Weintraub, S., et al. The Neuropsychological Profile of Alzheimer Disease. 2012. *Cold Spring Harb Perspect Med* 2:a006171
19. Zeisel, J. (2009). *I'm Still Here: A Breakthrough Approach to Understanding Someone Living With Alzheimer's*. Penguin Group.

©Daniel C. Potts, MD, FAAN

THANK YOU!

Daniel C. Potts, MD, FAAN
 Attending Neurologist, Tuscaloosa VA Medical Center
 Associate Clinical Professor, UA College of Community Health Sciences and USACOM
 Founder and President, Cognitive Dynamics Foundation
 dcpottsm@gmail.com/ www.cognitivedynamics.org

*Fellow, American Academy of Neurology
 *Member, Alzheimer's Association, Alzheimer's Foundation of America, UsAgainstAlzheimer's
 *Architect of Change, MariaShriver.com

©Daniel C. Potts, MD, FAAN