

What Is *Brain Fog* and Can It Improve?

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Medicine

Conflicts of Interest / Disclaimers

- Dr. Mills:
 - has no conflicts of interest or financial relationships to disclose
 - has been on the A Time To Heal Board of Directors since 2023 as a volunteer
 - teaches the A Time To Heal Brain Fog class 1-2x per year as a volunteer



Objectives

- Describe examples of Brain Fog
- Discuss the known and unknown aspects of Brain Fog
- Discuss strategies that may help improve symptoms
- Identify resources available to help individuals experiencing Brain Fog



Psychology Services In Cancer Care

Nebraska Medicine / Buffett Cancer Center

- Adam Mills
- Alice Mitwariciu
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Previously Dr. Emaan Lehardy & Dr. Lauren Holcomb



What Is Brain Fog?



Names and Definitions

- Brain Fog
- Cancer Related Cognitive Impairment
- Chemo Brain / Chemo Fog
 - People who have not had chemo also report Brain Fog



Common Brain Fog Symptoms



Mental cloudiness



**Forgetting things/
memory lapses**



**Difficulty making
decisions**



**Short attention
span**



**Difficulty starting,
planning, and
completing tasks**



**Increased time to
complete routine
tasks**



**Reduced problem-
solving ability**



**Word-finding
difficulties**



**Unusually
disorganized**



Causes of Brain Fog

- Direct (i.e., damage to the brain tissue or connections)
 - Cancer involvement (CNS lymphoma, brain tumors)
 - Cancer treatment (chemotherapy, radiation, immunotherapy, medications)
- “Indirect” (interfering with the process of cognition)
 - Emotional: Stress, anxiety, depression
 - Behavioral: Changes to routines and independence
 - Physical: Insomnia, pain, fatigue, hormone changes, malnutrition, low counts, other health issues, poor performance status
 - Pre-cancer risk (age, genetics)



Prevalence of Brain Fog

- Self report: > 50% report changes / struggles
- Measured: 15% - 20% demonstrate changes / struggles
- Differences explained by how questions were asked, how brain fog was measured, validity of the tests, high baseline cognition that is now 'average,' etc.



Trajectory of Brain Fog

- 25% - 33% may report impairment *before treatment begins*
 - Compared to ~5% of healthy matches
 - Causes: stress, insomnia, physical discomfort, fatigue
- 60% may report impairment directly after treatment
 - This improves on its own for some and not others
- 30% may report impairment longer term

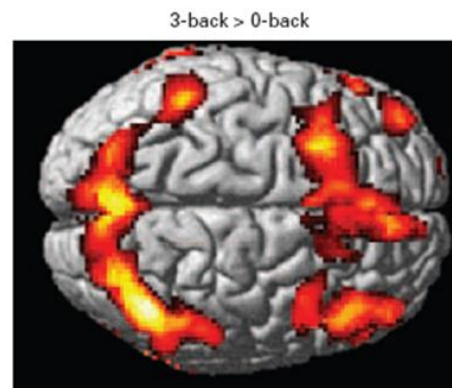
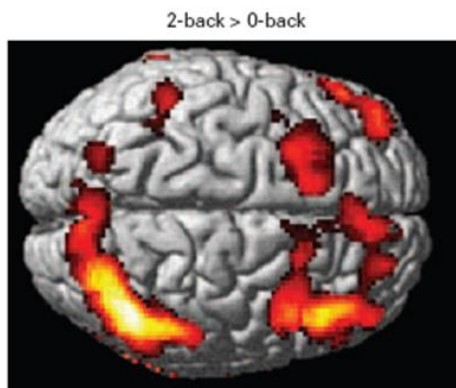
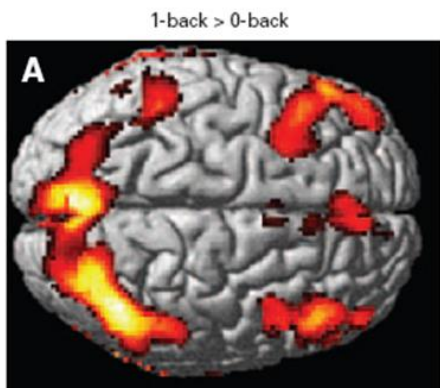


Simple Task

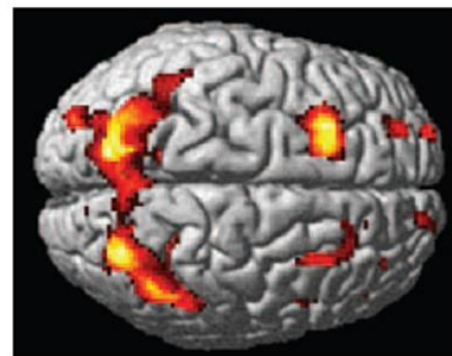
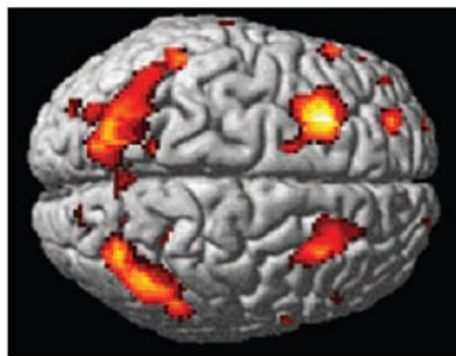
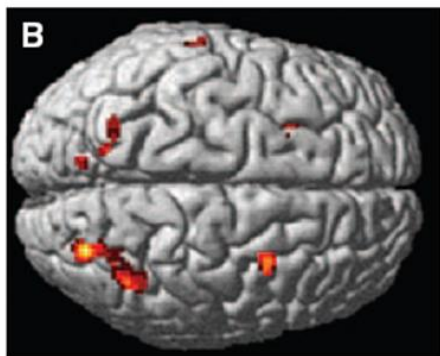
Moderate Task

Difficult Task

Twin A =
Cancer
Survivor



Twin B =
No
Cancer



Types of Cognition / Impairment

- Sensory memory
 - Hearing / seeing something
 - Lasts only a few seconds on its own
- Short-term memory
 - Holding information temporarily
 - Limited to X items at a time (5-9?)
 - Requires attention to become long term



Types of Cognition / Impairment

- Working memory / executive functioning
 - Holding and manipulating information in your head
 - Planning, organizing, decision-making, inhibition
 - Prospective memory (memory to do something)
- Long-term memory
 - Longer-term, more permanent
 - Semantic – general information (Lincoln is Capital of Nebraska)
 - Episodic – life events (I went to Lincoln last year)
 - Procedural – ‘muscle memory’ (Driving to Lincoln)



Name	Status	CPU	Memory
Microsoft Edge (27)		0.2%	1,135.8 MB
Xagt		0%	508.6 MB
Antimalware Service Executable		0%	193.5 MB
Microsoft PowerPoint		0%	163.1 MB
Microsoft Word (2)		0.4%	162.9 MB
Xagt		8.7%	136.0 MB
Desktop Window Manager		1.1%	96.4 MB
Filebeat		0.1%	82.1 MB
Windows Defender Advanced T...		0.8%	78.1 MB
Citrix HDX Engine (32 bit)		0.4%	57.8 MB
Windows Explorer (2)		0.9%	37.1 MB
Windows Defender Advanced T...		0.4%	35.9 MB
Host Process for Microsoft Conf...		0%	31.5 MB

about their social inadequacy and therefore maintain their anxiety for future interactions (Clark & Wells, 1995; Rapee & Heimberg, 1997).

Attention. Researchers have used several cognitive tasks in order to evaluate attentional processing in SAD. For example, the emotional Stroop task (e.g., Williams, Mathews, & MacLeod, 1996) instructs participants to name color words while ignoring the content of the word, and researchers have found that socially-anxious participants respond more slowly to social threat-related words (e.g., sweating; blushing) compared to neutral words (Grant & Beck, 2006; Mattia, Heimberg, & Hope, 1993), but nonanxious controls (Mattia et al., 1993) and participants with other anxiety disorders (Hope, Rapee, Heimberg, & Dombeck, 1990) do not demonstrate this slower response. Face-in-the-crowd paradigms (e.g., Gilboa-Schechtman, Foa, & Amir, 1999) have been used to examine participants' ability to detect target faces among large numbers of distractor stimuli, and have found HSAs (relative to LSAs) have enhanced ability to identify angry faces among neutral distractors, but difficulty ignoring emotional distractors when searching for a neutral face (Gilboa-Schechtman et al., 1999).

Most recently, researchers have used variations of dot-probe tasks (MacLeod, Mathews, & Tata, 1986), which can provide information about initial orientation, disengagement, and avoidance of threat stimuli. Typical dot-probe tasks present threat (e.g., a disgust or angry face) and neutral (e.g., a neutral face) stimuli simultaneously on either side of a screen, followed by a



**Task Manager shows
your 'working memory'**

**Different programs use
different amounts and
types of memory**

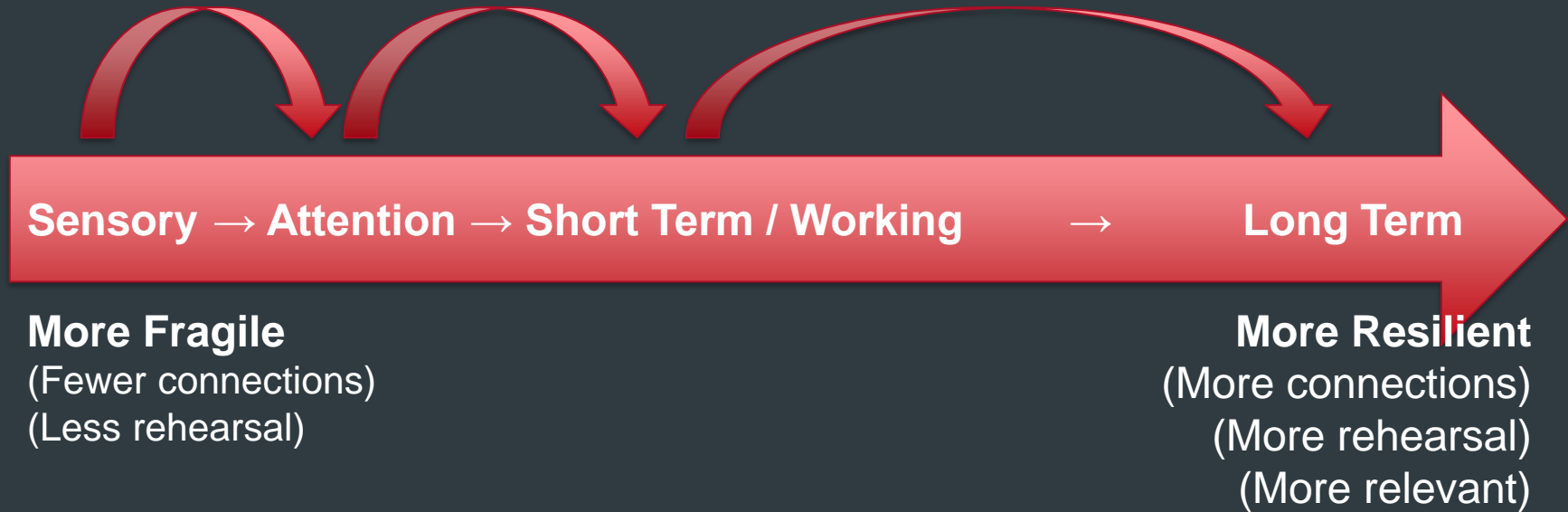
**Too many programs at
once means everything
slows down**

**Currently working on a
Word Document (Short
term memory)**

**I need to save it for it to
go on the hard drive
(long term memory)
and be available later**

**Human "hard drive"
does not get full,
does not require
deleting memories**

A Small Window to Remember



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A Small Window To Remember

Who am I?

What are my current colleagues' names?

Who are my former colleagues?



Strategies To Improve Brain Fog



Strategies to Improve Brain Fog

- Develop routines
 - Requires fewer resources for each activity
- Rehearse, practice, connect – short term into long term
- Increase mindfulness / decrease multitasking
 - Improve attention for the task at hand → better chance of it going into long-term memory
- Improve self-awareness / self-monitoring



Strategies to Improve Brain Fog

- Use tools & technology
 - Notepads / phones / alarms / apps / calendars
- Improve indirect contributors to Brain Fog
 - Stress / Anxiety
 - Mood
 - Sleep
 - Overall health



Strategies to Improve Brain Fog

Be kind to yourself

- Brain Fog is real and documented
 - Self report, MRI studies, neuropsychological testing
- We don't have all the answers, but we have some
- You are not going crazy or losing your mind
- You are not stupid
- You very likely do not have dementia / Alzheimer's
- This can get better
- You are not alone (but not everyone understands)



Additional Resources



Additional Resources

- **A Time To Heal – Navigating Brain Fog Class**
 - Free!
 - Open to individuals who have experienced cancer, COVID-19, or other medical conditions
 - 90-minute classes over 6 weeks
 - Zoom / online classes & in-person classes
 - Will teach specific strategies for various scenarios (grocery shopping, remembering names, tackling large projects, managing distractions)



Additional Resources

- **A Time To Heal – Survivorship 101**
 - Free!
 - Open to individuals who have experienced cancer
 - Including special class for individuals under 45 years old
 - 9-week course
 - Focused on emotional and physical health



References

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