

# **Cognitive Changes & Cancer Treatment: Chemo Brain and Beyond**

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# Objectives

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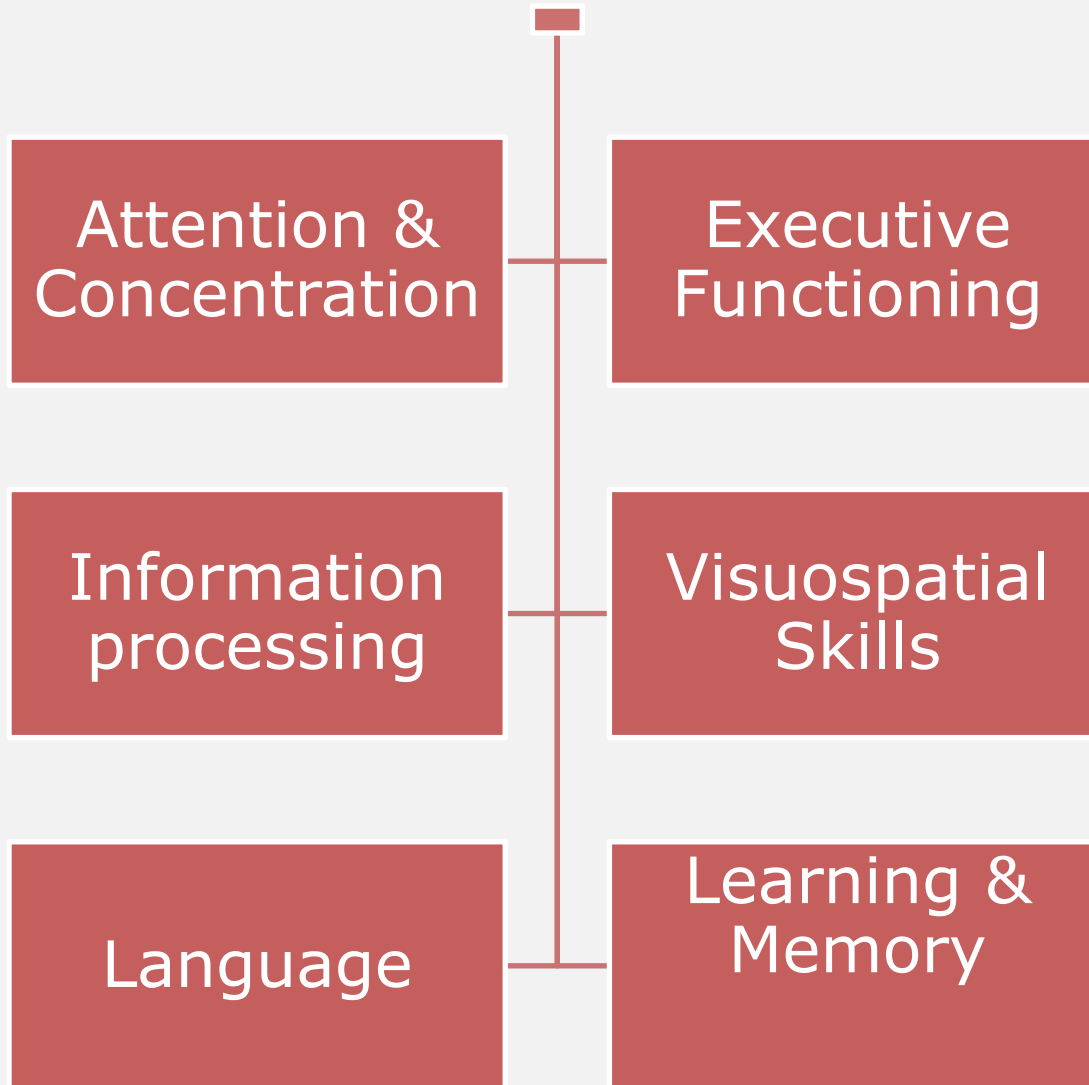
- ▶ What is cognition and how can it change with cancer and cancer treatment?
- ▶ What symptoms may occur and how are they evaluated?
- ▶ What strategies can be helpful?
- ▶ Are cognitive exercises worthwhile?

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# WHAT IS COGNITION?

*“The mental action or process of acquiring knowledge and understanding through thought, experience, and the senses”*

# Six Domains of Cognition



# What We Know: Cancer + Cognition

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- ▶ **IT'S COMMON.** Cognitive change is one of the most frequently described symptoms during treatment and in the post-treatment periods
- ▶ **IT DOESN'T DISCRIMINATE.** The side effects are seen across many different types of cancers and types of treatments
- ▶ **IT'S COMPLICATED TO STUDY.** The multimodality nature of cancer treatment makes it hard to pinpoint exact cause(s).

# What We Know: Cancer + Cognition

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- ▶ **THERE ARE RISK FACTORS.** Preexisting illness, age, health frailty, use of alcohol/drugs, mental health problems, hormone & menopause status, higher stages of disease, etc. may contribute to cognitive dysfunction.
  
- ▶ **TIMING PLAYS A ROLE.** Most people report improvement in cognitive function following the end of primary treatment. For others, improvement may be gradual (occurring over one to two years).

# Most Common Complaints

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- Difficulty multitasking; must focus on one thing at a time
- Trouble concentrating; inability to focus on tasks
- Memory lapses and forgetfulness
- Difficulty following instructions
- Decreased ability to handle personal finances
- Disorganized behavior or thinking
- Loss of initiative
- Difficulty finding common words and recalling names

# How Do We Test?

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## Cognitive Screening

- ▶ Mini-Mental State Exam (MMSE)
- ▶ Montreal Cognitive Assessment (MoCA)
- ▶ Patient-reported outcome measures and surveys

## Formal Testing

- ▶ Typically a 3-4 hour battery of tests conducted by a Neuropsychologist
- ▶ Specialized, focused testing by Speech-Language Pathology (SLP) and/or Occupational Therapy (OT)

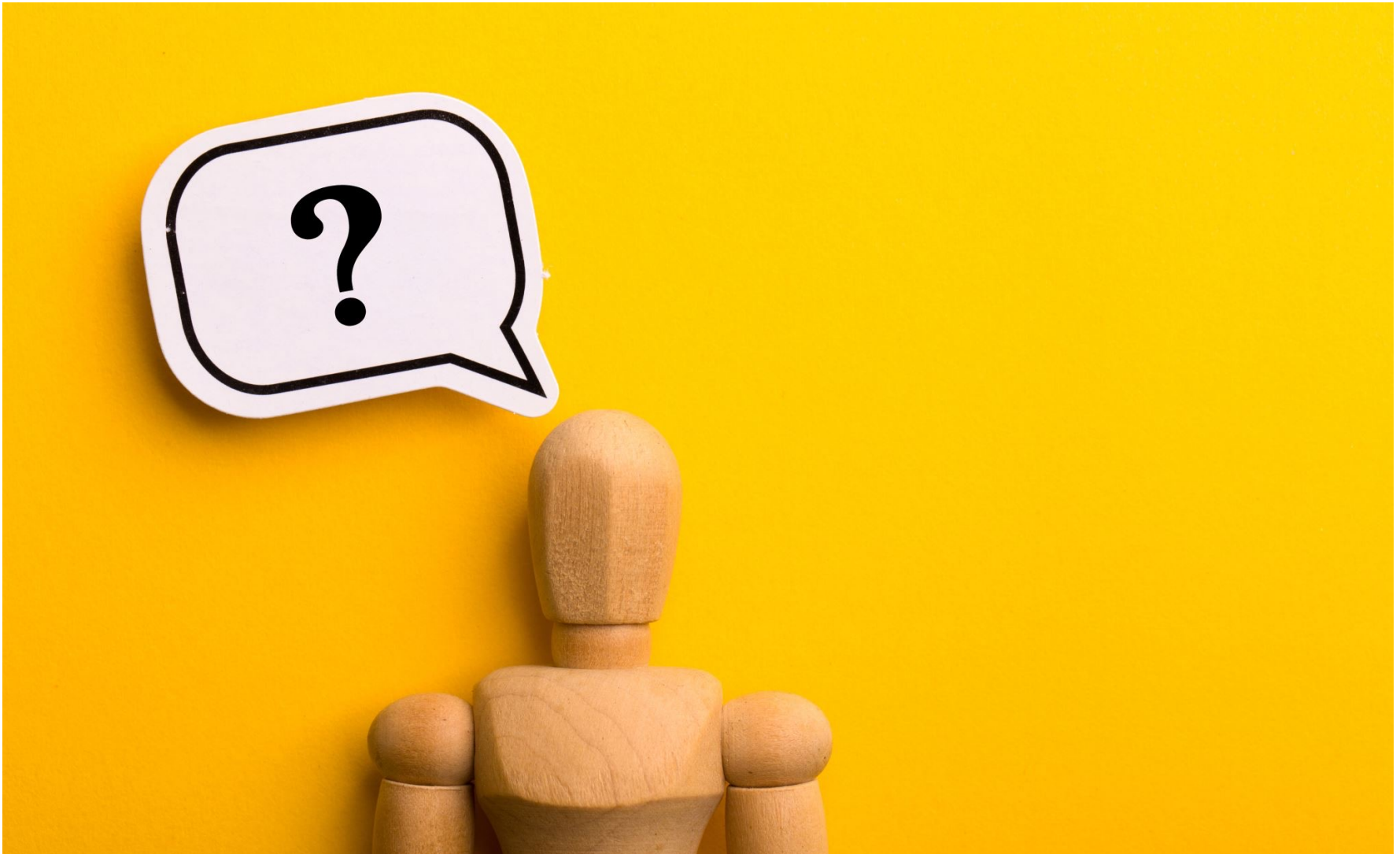


# Complaints vs Testing Performance

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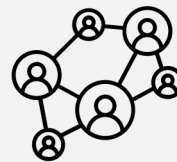
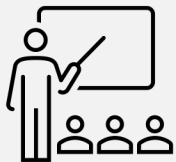
- ▶ Performance on tests often  $\neq$  degree of complaint severity
  - Patients can often score in the normal range for their age/IQ-matched profile despite having concerns
- ▶ Instead, these factors influence perceived cognitive problems to a greater degree than performance
  - Fatigue
  - Anxiety
  - Depression
  - Insomnia
  - PTSD
- ▶ Imaging studies also suggest that cancer patients employ compensatory activation of other brain regions to maintain performance levels

# So what do we do about it?



# Proactive Approaches

- ▶ Evidence-based interventions to manage cognitive impairment in cancer patients and survivors have not been firmly established
- ▶ But these proactive approaches show promise:
  - EDUCATION
  - COGNITIVE REHABILITATION
  - EXERCISE & PHYSICAL ACTIVITY
  - PSYCHOSOCIAL INTERVENTIONS



# Education Goals

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- ▶ **LEARNING** about brain functioning, cognitive deficits, and their consequences for daily life can be reassuring and empowering
  
- ▶ **BALANCING** the timing and load of educational content that you consume is important.
  - We don't want anyone to feel overwhelmed or burdened by this knowledge.
  - We also don't want people primed that they're destined for problems when they may not be.

# Cognitive Rehabilitation Goals

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- ▶ **Compensatory training** focuses on the acquisition of new behaviors and strategies to compensate for changes
- ▶ Modifying the environment
  - Reduce clutter, clearly label storage and signage
  - “Don’t put it down, put it away”
- ▶ Create more structure and organization
  - Use external aids: calendars, lists, pill boxes, alarms, journals, and apps
  - Develop routines and try to stick with them
- ▶ Learn new coping strategies
  - Pacing cognitive activities (25 minutes ON/5 minutes OFF) to allow for rest
  - Breaking down larger tasks into smaller chunks
  - Minimizing distractions

# Cognitive Rehabilitation Goals

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- ▶ **Cognitive training** involves the use of repetitive, increasingly challenging tasks to improve, maintain, or restore cognitive function
- ▶ Can be done independently in the home setting or with a trained provider (e.g. SLP) in a therapy setting
  
- ▶ **TASK SPECIFICITY** is key when selecting what type of exercise you want to do (e.g., do a memory exercise to train memory, a word-finding task to train language)
  
- ▶ **CONSISTENCY** of practice is also critical to having a good outcome. It's better to practice for 20-30 minutes every day, then larger “binges” of practice only 1-2x per week.

# Cognitive Rehabilitation Goals

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- ▶ **APP/WEB-BASED PROGRAMS** are undoubtedly a convenient and a popular option.
- ▶ **PROS:** offer a wide variety of exercises, software adapts to performance to adjust difficulty levels, can be accessed almost anywhere, no other supplies needed than smart device
- ▶ **CONS:** cost (\$\$+), activities don't always generalize to everyday tasks that someone has trouble with
- ▶ Suggested options: Constant Therapy, BrainHQ, Elevate, Lumosity

# Cognitive Rehabilitation Goals

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- ▶ **NON-TECH ACTIVITIES** are simpler options that do not involve devices and are based more on activities of daily living.
- ▶ **PROS:** cost-efficient, no fuss with technology, often more realistic and reflective of life skills
- ▶ **CONS:** some materials and pre-planning is needed, keeping it “new & interesting” takes some effort
- ▶ Suggested options: listing items in categories, generating synonyms and antonyms, creating or editing news headlines, summarizing articles or book chapters, writing a picture description, sequencing the steps to complete a task, studying/reciting grocery lists, join a book club



# Cognitive Rehabilitation Goals

## ▶ **NON-TECH ACTIVITIES** cont.

### ▶ Traditional “Brain Games/Puzzles” (a few examples)

Cognitive Domain	Game
Attention & Concentration	Card games, Uno, Bridge
Memory	Guess Who, memory matching cards, Simon, Scene It, Trivial Pursuit,
Language	Wordle, Taboo, Scattegories, Balderdash, Boggle, Catch Phrase, crossword puzzles, Scrabble
Visuospatial/Constructional	Jigsaw puzzles, word searches, find the difference
Executive Functioning	Chess, checkers, Sudoku, Battleship, Connect Four

# Physical Exercise & Psychosocial Wellness

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- ▶ **There is increasing interest in physical and mind-body exercise to address cognitive impairment in cancer survivors**
- ▶ 2018 Hartman et al. study showed improved processing speed in patients who participated in 12 week exercise program
- ▶ 1991 Cimprich study showed that people who participated in attention-restoring activities ( e.g. walking or sitting outdoors, tending plants or gardening, watching wildlife, and caring for pets) had better capacity to direct attention
- ▶ 2016 Johns et al. study showed improved attention and working memory in patients who participated in a mindfulness-based stress reduction therapy program

## Take Home Message



Cancer survivors and those currently undergoing treatment may all experience symptoms of cognitive change



The specific symptoms may vary person-to-person, depending on different risk factors and disease circumstances



There are ways for your healthcare providers to screen and formally test your complaints



You can thankfully still perform well on formal cognitive testing despite being symptomatic



Being educated and informed about these changes in advance can be reassuring (you're not alone!) and empowering (you can do something about it!)

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# QUESTIONS?