Drive Mindful, Drive Skillful

A Cognitive Training Guide

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BEFORE YOU BEGIN

Please take the pre-survey before completing any exercises/ training with H&T Driver Rehabilitation Specialists. You will be asked to complete another survey at the conclusion of the program. We ask you to provide your name on the surveys to compare results and ensure the program was effective. This program is independent of your evaluation with H&T Driver Rehabilitation Specialists, and participation in the survey will not affect your evaluation scores in any way. The purpose of the survey is to assess the effectiveness of the program. It should take less than 10 minutes to complete and is voluntary. However, your input will help develop meaningful and effective resources for you and for future clients. The survey may be completed by the client or by a caregiver, family member, or support person providing responses based on the client's input if needed.

OVERVIEW

This program was created by an occupational therapy student for their doctoral capstone project. An occupational therapist helps individuals gain or regain the skills needed to do what they want or need to do in their day-to-day life. The importance of driving varies across age groups and from person to person. Some implications include accessing health obligations such as appointments or procedures, getting to work or school, and attending social events. However, many individuals determine they are fit to drive without considering the mental or cognitive aspects required, which can present danger to both them and others around them (DiBlasio et al., 2025; Meyer et al., 2023). By reviewing this program and completing a formal driving evaluation with H&T Driver Rehabilitation Specialists, you are taking the right steps toward safe driving.

This is a 1-month evidence-based program containing online exercises that have been shown to improve or maintain cognition. This packet will not cover physical abilities, visual acuity, or peripheral vision. With visual acuity of 20/40 in the better eye or both eyes, you will not need corrective lenses or an eye specialist's note (Drive Safely, n.d.). If your visual acuity is 20/50 with corrective lenses, you will be allowed to drive while wearing those corrective lenses. If you suspect that your vision may not meet these requirements, please mention it to an H&T Driver Rehabilitation Specialists staff member. If it is deemed during your driving evaluation that visual acuity or peripheral vision is below the state standard, the driving evaluation may be stopped and the client will be recommended to a see vision specialist for further evaluation.

It is important to note that a majority of research shows that only doing cognitive training exercises has limited transferability to driving skills. The aim of this program is to provide individuals with resources that have been shown to improve or maintain cognitive and visual abilities. This could therefore improve the odds of passing the clinical portion of the driving evaluation. If it is determined that further training is required for safety while behind-the-wheel, cognition focused training will be recommended to occur in the car with a member of H&T Driver Rehabilitation Specialists.

INTRODUCTION

I. Cognition's Role in Driving

Driving requires a complex combination of cognitive skills to complete. Some of the most notable are decision making or problem solving, attention, memory, processing speed, and visual processing (DiBlasio et al., 2025; Ettenhofer et al., 2019; Meyer et al., 2023; Navarro et al., 2018; Nozawa et al., 2015; Tapia et al., 2023; Tapia et al., 2025). These skills and their relation to driving are explained further below. This is not an exhaustive list, but provides important considerations when determining fit to drive.

A. Attention: Sustained attention is important for being able to react to the ever changing environment that occurs while driving. A few examples include noticing road signs, the actions of other cars, and avoiding closed roads (Tapia et al., 2025).
B. Procedural memory: A form of long-term memory that relates to automatically knowing and completing the steps of a task. This is important for remembering the rules of driving, operation of the car, why and where someone is going, and for driving common routes (Diblasio et al., 2025; Tapia et al., 2023).
C. Short term memory: Important for immediate tasks that occur while driving. For example, remembering that you just passed a merge sign or upcoming stoplight sign, or checking your blind spot and remembering if a car was there or not (C. Thompson, personal communication, January 12, 2026).
D. Processing speed: Refers to how fast someone can take in, process, and respond to a stimulus. It is needed for making quick and effective decisions on the road, such as avoiding an object in time to not hit it or braking when you see brake lights (Navarro et al., 2018).
E. Decision making: Refers to the actions someone takes while driving. It plays a role in how fast one decides to drive, when to change lanes, and when to stop (Tapia et al., 2025).

II. Vision's Role in Driving

Vision goes beyond just acuity (how well you are able to see). It also includes your field of vision, your contrast sensitivity, and the movement of your eyes. Vision often goes hand in hand with cognition, as it provides your brain with the information you see, and therefore allows the brain to generate an appropriate response (C. Thompson, personal communication, January 12, 2026). These aspects and their relation to driving are described further below.

A. Visual Acuity: Refers to how well someone is able to see and is important for reading and interpreting fine details such as words on a sign (C. Thompson, personal communication, January 12, 2026).

B. Visual Processing: Refers to the brain's ability to process and interpret what is seen. It is important for gauging the driver's control of the car in comparison to other cars and objects, such as for changing lanes, responding to a stop light, and stopping at an appropriate distance from other cars (Tapia et al., 2025).

C. Visual Scanning: Refers to being able to scan the driving environment and understand multiple events happening at once. It is important for being able to move your eyes back and forth between the road, other cars, GPS, and road signs (C. Thompson, personal communication, January 12, 2026).

D. Contrast sensitivity: Refers to the eye's ability to see in different lighting settings. This is extremely important for being able to identify items in low light conditions, such as night driving (C. Thompson, personal communication, January 12, 2026).

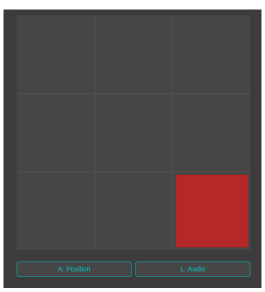
COGNITIVE TRAINING

I. Definition

Cognitive training refers to completing therapeutic activities that directly use the cognitive skills needed for a task. Its goal, through regular and repetitive use, is to improve the use of these skills for functional activities (such as driving) (Basak et al., 2020). Furthermore, game-based brain training has been shown to promote multiple cognitive functions (Wang et al., 2021). A majority of research is centered around the older population and those with mild cognitive impairments, but cognitive training can be beneficial for all ages and across diagnoses (Alweis & Alweis, 2025; Basak et al., 2020).

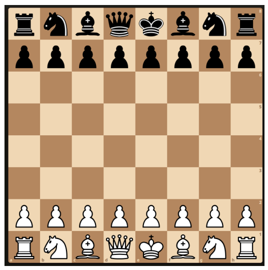
II. Activities

➜ N-Back



N-Back involves the ability to attend to, process, recall, and form associations between information that is seen or heard, while ignoring irrelevant information. Studies have shown that repetitive training in this task can lead to improved visual processing, distribution of attention, and overall working memory (Guo et al., 2023; Juras et al. 2024; Pugin et al., 2014; Salminen et al., 2016). The dual N-Back task also works on being able to cognitively shift between two ideas. These cognitive abilities are tested by H&T Driver Rehabilitation Specialists due to their importance in being able to attend to and process various information seen while driving, and acting accordingly in a timely manner.

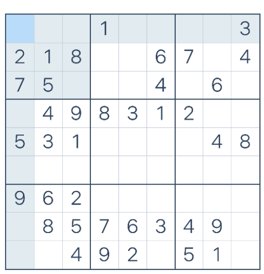
➜ Chess



Board games in general have been shown to improve attentional control, working memory, and problem solving. Chess in particular is an abstract strategy game that requires adequate processing speed, continuous understanding of new information, combining new information with existing knowledge to form a comprehensive idea, and short-term memory to plan and strategize a move. Therefore, chess as a training tool has resulted in various improved abilities including executive functions, concentration, attention, processing speed, and planning (Alweis & Alweis, 2025; Martinez et al., 2023). These cognitive abilities are tested by H&T Driver Rehabilitation Specialists due to their importance in being able to attend to and process various stimuli and information seen while driving, and planning an action accordingly in a timely manner.

- Note: Chess is a very complex game, and may be difficult to learn for some. Checkers may be an effective alternative option, but chess is highly recommended due to its complexity and use of multiple cognitive systems (Martinez et al., 2023).

➜ Sudoku

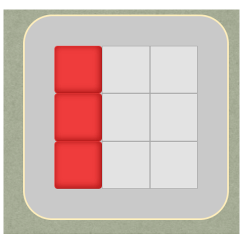


Sudoku requires problem solving and decision making to place numbers in the correct space, attending to various numbers at once, and cognitive shifting to replan. It activates the executive function parts of the brain including attention, working memory, decision-making, and problem solving (Ashlesh et al., 2020). Additionally, participation in Sudoku or similar puzzles has been associated with better performance on grammatical reasoning, spatial working memory, and episodic memory tasks (Ferreira et al., 2015). These cognitive abilities are tested by H&T Driver Rehabilitation Specialists due to their importance in being able to quickly process and find solutions to problems that arise, attending to the multi-component driving environment, and recalling previously learned information.

➜ Match-3

Match-3 games require tracking changing stimulus, continuous scanning of game pieces, and strategic planning to complete. To win the game and match 3 items, it also requires creating and identifying patterns (Oei & Patterson, 2013; Urwyler et al., 2023). These cognitive abilities are tested by H&T Driver Rehabilitation Specialists due to their importance in being able to visually switch between objects (such as the road, a merge sign, and a car in the lane next to you), and combine them to create an understanding of the environment (remember there is a car there before changing lanes according to merge sign).

➜ Memory Matrix



Memory Matrix has been shown to improve visual search and spatial working memory. Due to the memory matrix game having less cognitive demands than other games, it allows for in-depth training of visual-spatial working memory only (Oei & Patterson, 2013). H&T Driver Rehabilitation Specialists test this cognitive ability due to its importance in tracking other objects, anticipating changes, processing stimuli, and planning a response while driving.

➜ Hidden-Object

Hidden-Object: Finding an object in a busy background is called figure-ground. Additionally, being able to identify an object that is only partially shown, is considered visual closure (C. Thompson, personal communication, January 12, 2026). Specific hidden-object games involve both of these, and have been shown to improve visual search and spatial working memory (Oei & Patterson, 2013). H&T Driver

Rehabilitation Specialists test both of these cognitive abilities, due to their importance in gathering information while driving and using it to plan an appropriate and safe action.

III. Protocol

Research varies greatly on how often cognitive training should occur for the best results. However, many studies with positive results had their participants complete exercises between 2-5x a week, with the maximum usually being for 1 hour. This program encourages the use of a computer for cognitive training, but it is important to note that being active and exercising is equally as important because it facilitates brain health and function, and therefore has a positive effect on higher level cognition (Zhou et al., 2020). **Please use the table on page 12 to take notes and track of your progress.**

➜ Weekly Progression

- Day 1: Chess (30 minutes), Match-3 (20 minutes)
- Day 2: N-Back (20 minutes), Memory Matrix (20 minutes)
- Day 3: Hidden-object (20 minutes), Sudoku (20 minutes)
- Day 4: Chess (30 minutes), N-Back (20 minutes)
- Day 5: Sudoku (20 minutes), Memory Matrix (20 minutes)

➜ Game Progression

Chess: Chess is a very complex game, with multiple moving pieces.

- For the first day, focus on learning the pieces and their moves. Complete all "chess pieces" modules and the first two "fundamentals" modules (capture and protection) provided by lichess.org.
- On the second day, first review what you learned on day 1 using the beginner cheat sheet provided by https://www.chess-game-strategies.com/. You may also want to save or print this page for future reference. Then, complete the last 4 modules on lichess.org under fundamentals (combat, check in one, out of check, and mate in one)

- On the third day (week 2), review the game pieces and rules you learned last week using the cheat sheet provided by chess.com. Then, begin playing! Try to beat your opponent at https://www.chess.com/play/computer OR play on a physical board with a peer.
    - ➜ Start by clicking "adaptive" and the first character. The adaptive setting will allow you to click the light bulb in the bottom right for a hint.
- As you grow more comfortable and win games, attempt the beginner, intermediate, advanced, and master levels.

Match-3: https://www.bubbleshooter.net/game/bejeweled/

- Your goal is to match 3 jewels, and pass each level without running out of moves. Your moves run out when there are no more matches, but the progress bar on the bottom is not filled. Larger matches (4 in a row), or moves that create more than one match, gains more progress points. Try to increase the amount of levels you can pass each time you play!

N- Back: https://brainscale.net/app/dual-n-back/training

- For the first day, set up the game using the following settings:
        - ✦ Change "Type" in the top right corner to position only and hit save.
        - ✦ Change "N-Back" in the top right corner to 1.
    - Play instructions: You are trying to remember the position (or location in the grid) of the square that flashed 1 before the current square. When you believe it matches, you hit the "position" button (e.g., a square flashes in the top right box. If it then flashes there again, you hit the position button. If it flashes in the bottom left, you do not press any button until it matches again.)
- After achieving a success rate of 80-100%, set up the game using the following settings:
        - ✦ Change "Type" in the top right corner to audio only and hit save.
        - ✦ Change ""N-Back" in the top right corner to 1.

    - Play instructions: You are trying to remember the letter said 1 before the current letter. When you believe it matches, you hit the “Audio” button (e.g., if you hear “L”...”L” you hit the audio button. If you hear “L”...”K”, you do not press any button and wait until you hear the same letter twice again.)
- Once you hit 80-100% accuracy, advance to the next level. Set up the game using the following settings:
        - ✦ Change “Type” in the top right corner to position only and hit save.
        - ✦ Change “N-Back” in the top right corner to 2
    - Play instructions: You are trying to remember the position (or location in the grid) of the square that flashed 2 before the current square. When you believe it matches, you hit the “position” button. (e.g., if the square flashes in the top right box, then flashes in the top left, then in the top right again, you hit the position button when you see it in the same position as two flashes ago. If the square flashes in the top right box, then flashes in the top left, then in the middle, you do not hit any button.)
- Once you hit 80%-100% accuracy, you can continue to progress the game by adding more stimuli. Try changing the type to audio AND position and keeping N-Back at 1. Then, change N-Back to 2, and so on.

Memory Matrix: https://ttitto.github.io/ (Tip: make the game bigger by clicking the 3 stacked dots in top right of the webpage and increase the zoom).

- Your task is to remember the position of each of the squares presented, and recall them by clicking the same squares. This game is adaptive, so the grid will get smaller when you get one wrong and get bigger when you get one right. Click the screen between each attempt to continue. Try to beat your previous score by increasing the number of squares presented each time!

Sudoku: Your task in sudoku is to fill each grid with numbers 1-9. Each row, column, and grid can only have each number once.

- For the first day, start by learning the basics of the game with a 4x4 grid (numbers 1-4).
- After completing with 0 errors, move on to the 6x6 grid (numbers 1-6).
- After completing with 0 errors, move on to playing a full grid with hints available: https://sudoku.com/easy/ (do not make too many guesses or you will lose the game and have to restart! By clicking the pencil icon, you can make notes without submitting a number). After completing each with 80-100% accuracy, progress through easy, medium, and hard.

Hidden Object: https://www.crazygames.com/game/hidden-objects
https://www.crazygames.com/game/find-me-lost-objects

- Your task is to find each of the provided items. You can click and drag the screen to look around. After achieving 3 stars, move on to the next level.
- After completing each level on the first link, try the hidden object game listed below. It has a more distracting background, making objects harder to identify.
    - https://www.crazygames.com/game/hidden-objects

Progress Tracking

	Chess	Match-3	N-Back	Memory Matrix	Sudoku	Hidden Object
Week 1	Day 1: Day 2:		Day 1: Day 2:	Day 1: Day 2:	Day 1: Day 2:	
Week 2	Day 1: Day 2:		Day 1: Day 2:	Day 1: Day 2:	Day 1: Day 2:	
Week 3	Day 1: Day 2:		Day 1: Day 2:	Day 1: Day 2:	Day 1: Day 2:	
Week 4	Day 1: Day 2:		Day 1: Day 2:	Day 1: Day 2:	Day 1: Day 2:	

THANK YOU

Thank you for completing this program. We would greatly appreciate your feedback in the post-survey. We ask you to provide your name on the surveys to compare results and ensure the program was effective. This program is independent of your evaluation with H&T Driver Rehabilitation Specialists, and participation in the survey will not affect your evaluation scores in any way. The purpose of the survey is to assess the effectiveness of the program. It should take less than 10 minutes to complete and is voluntary. However, your input will help develop meaningful and effective resources for you and for future clients. The survey may be completed by the client or by a caregiver, family member, or support person providing responses based on the client's input if needed.

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