

NSTSCE

National Surface Transportation
Safety Center for Excellence

CENTER for GERONTOLOGY

*Senior Mobility Awareness Symposium:
Integrating Science, Policy, and Practice*

December 6, 2012
Blacksburg, Virginia

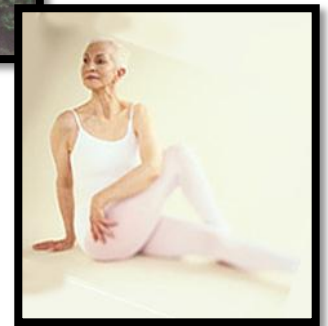
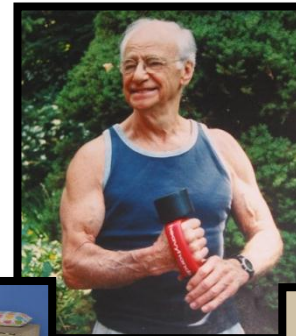
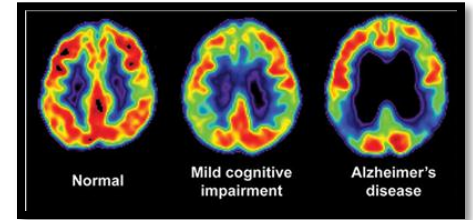
Goal: Mobility Independence

- How to achieve?
 - ▣ Smarter community design
 - ▣ Ride sharing
 - ▣ Autonomous vehicles?
 - ▣ Helping seniors drive longer and safer



Age-Related Impediments

- Varies greatly across individuals
 - ▣ Slower decision-making, dementia
 - ▣ Reduced visual ability
 - ▣ Reduced strength & flexibility
 - ▣ Slower reaction time
 - ▣ Driver's Ed – distant past or none at all



Countermeasures

- Vehicle-Based
- Driving Restrictions
 - ▣ Voluntary
 - ▣ Restricted License



- Physical/Occupational Therapy/Rehab

- Training ★

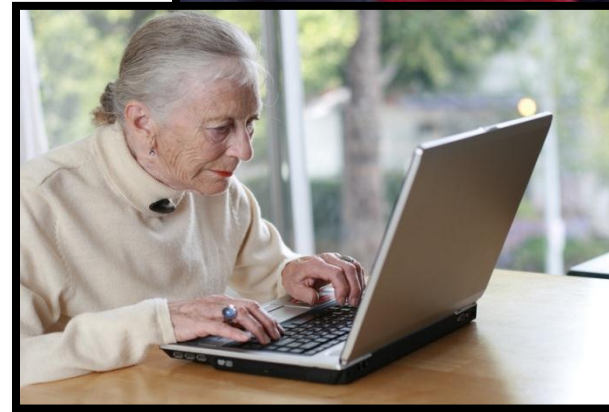


Training Approaches

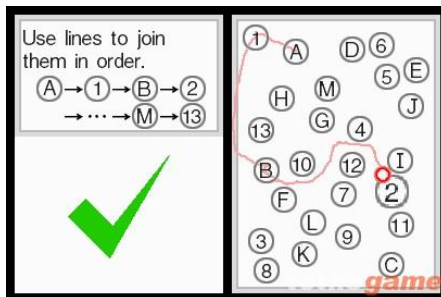
- Driving Skills
 - ▣ Classroom
 - ▣ On-Road
 - ▣ Online




- Physical



- Brain

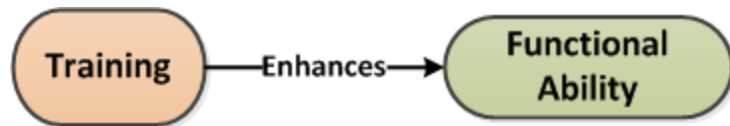


Training Conceptual Overview

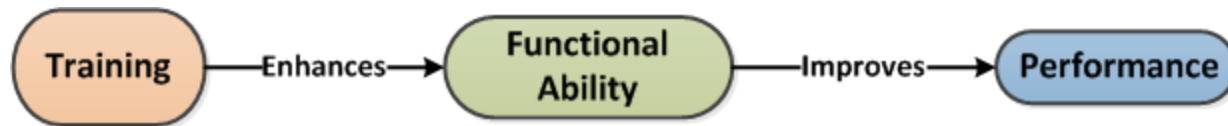


Training

Training Conceptual Overview



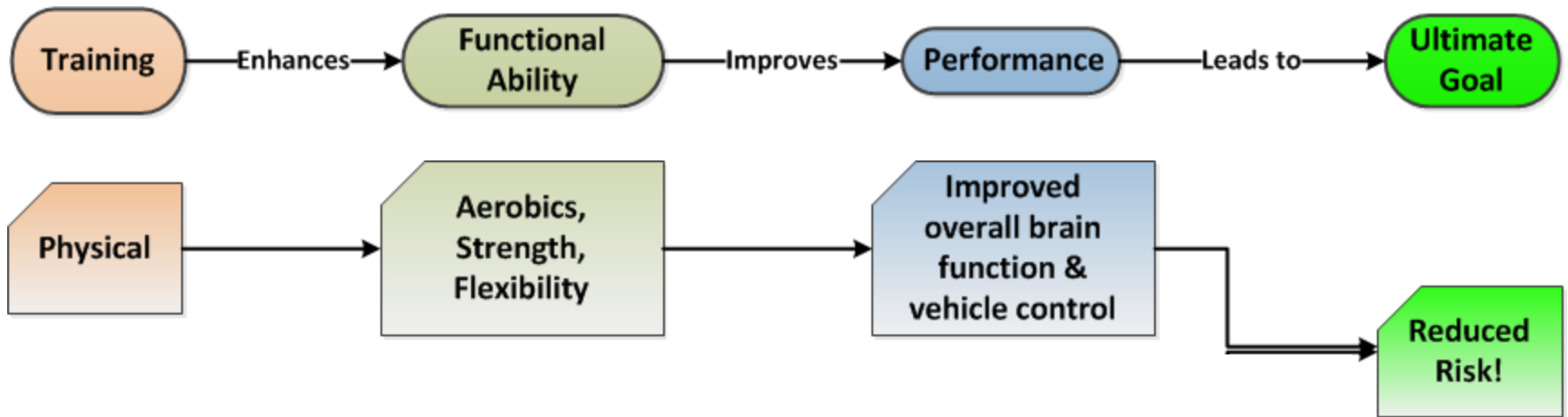
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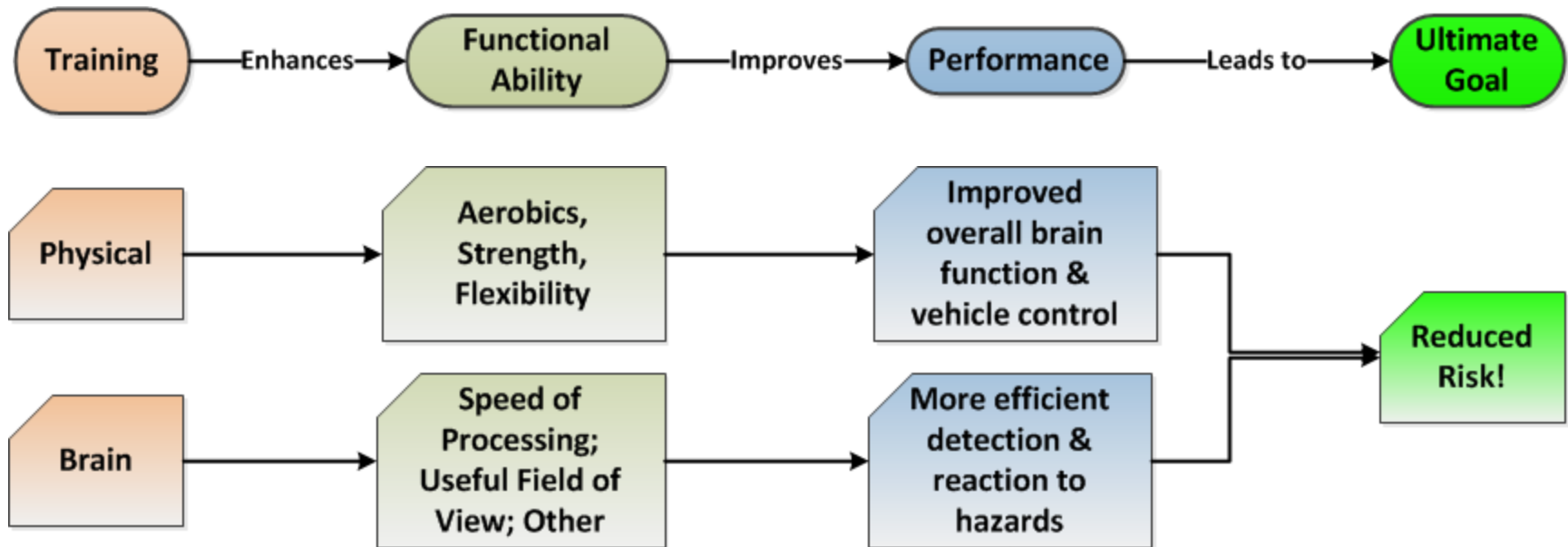
Training Conceptual Overview



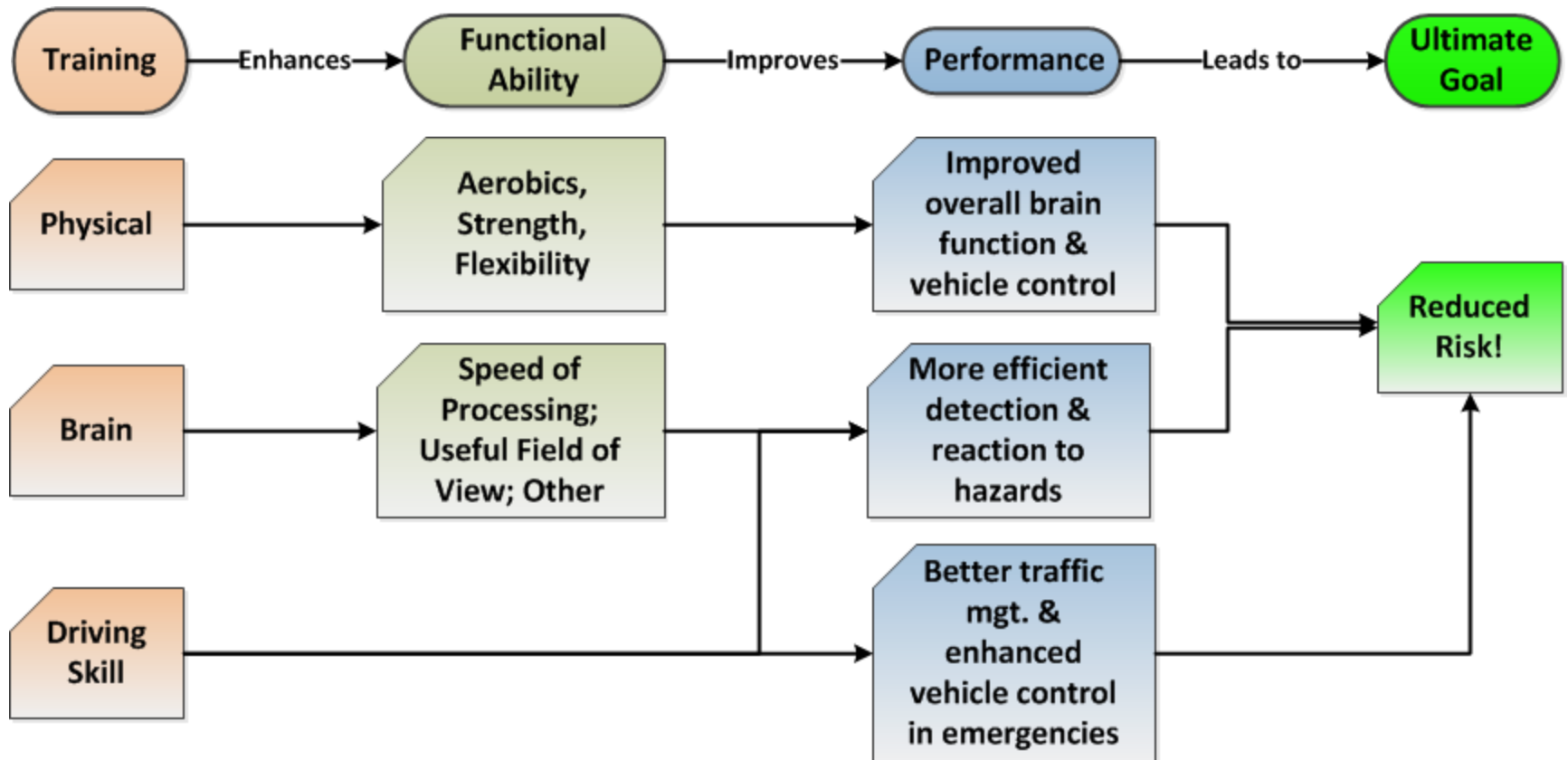
Training Conceptual Overview



Training Conceptual Overview



Training Conceptual Overview



Driver/Driving Training



Driver/Driving Training Background

- Evidence shows less safe scan patterns
 - Too narrowly focused straight ahead instead of scanning more broadly for hazards
 - Research Coaching & feedback may reverse



Driving Skills Training: Research

- Marottoli et al. (2007) found classroom and on-road training of common problem areas produced better knowledge and on-road test scores
- Pollatsek et al. (2012) found scan pattern training & feedback improved senior drivers scan performance at intersections
 - concluded bad habits more than age-related deficits are more responsible for problems
- Porter (2012) found video feedback in addition to classroom instruction → 25% reduction in driving errors

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Driving Skills Training: Prominent Programs



- Online Senior Driving Course – self assessment, medications, licensing laws
- Keeping the Keys – free workshop



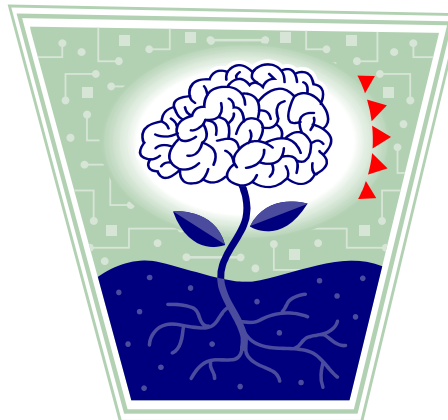
- Peer taught in-person course imparts updated knowledge of driving skills, road rules, and insight into driver impairments
- Online course as well

Brain Training



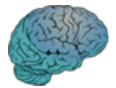
Brain Training Background

- **Neuroplasticity** – experience/environment/training can influence brain structure and function
 - ▣ Evidence that it continues throughout the lifespan, permitting learning to continue as well (O’Connell and Robertson, 2012)



Brain Training Research

- Lots of vendors offering brain training:



Brain Metrix

CogniFit®

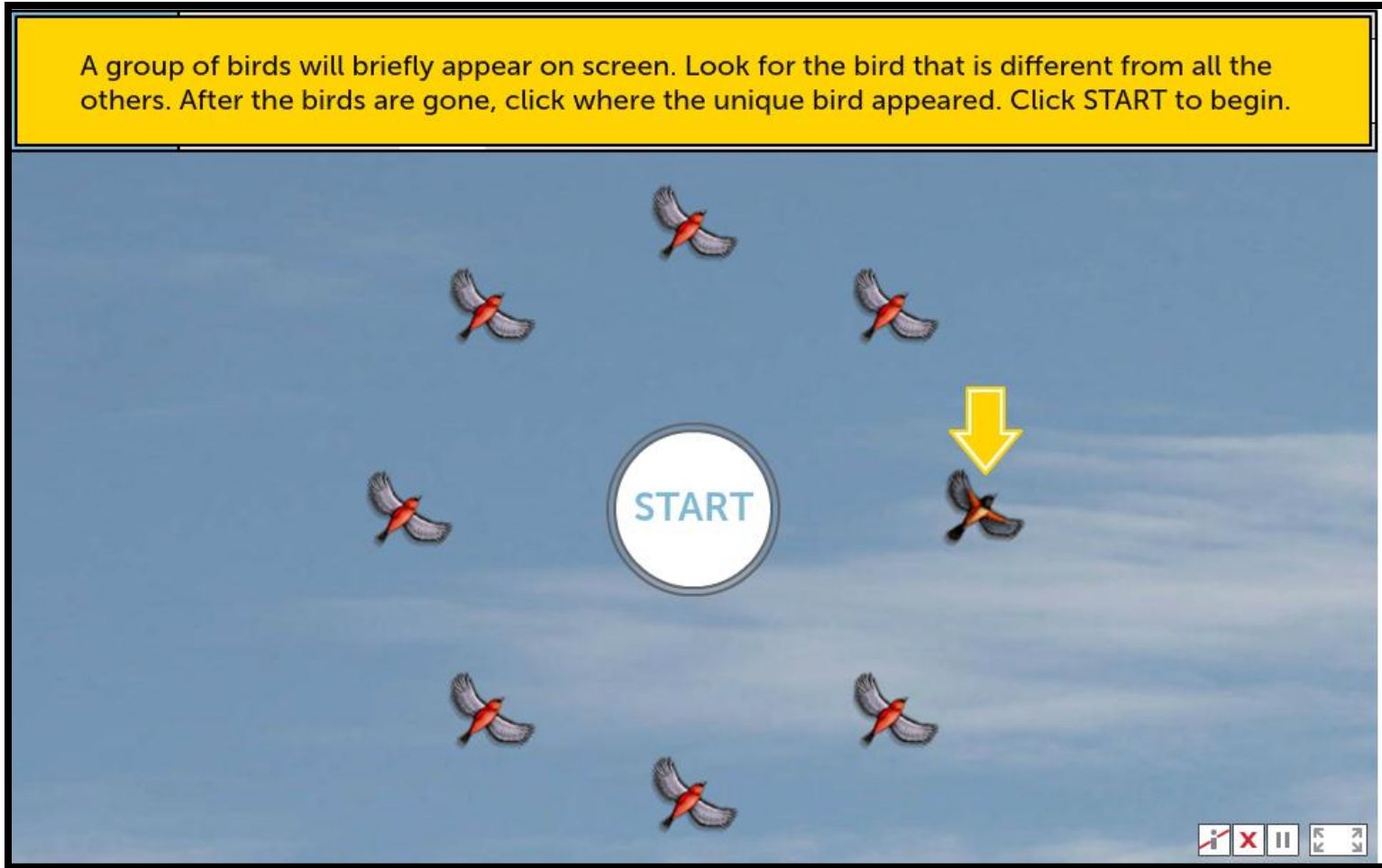
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PositScience®

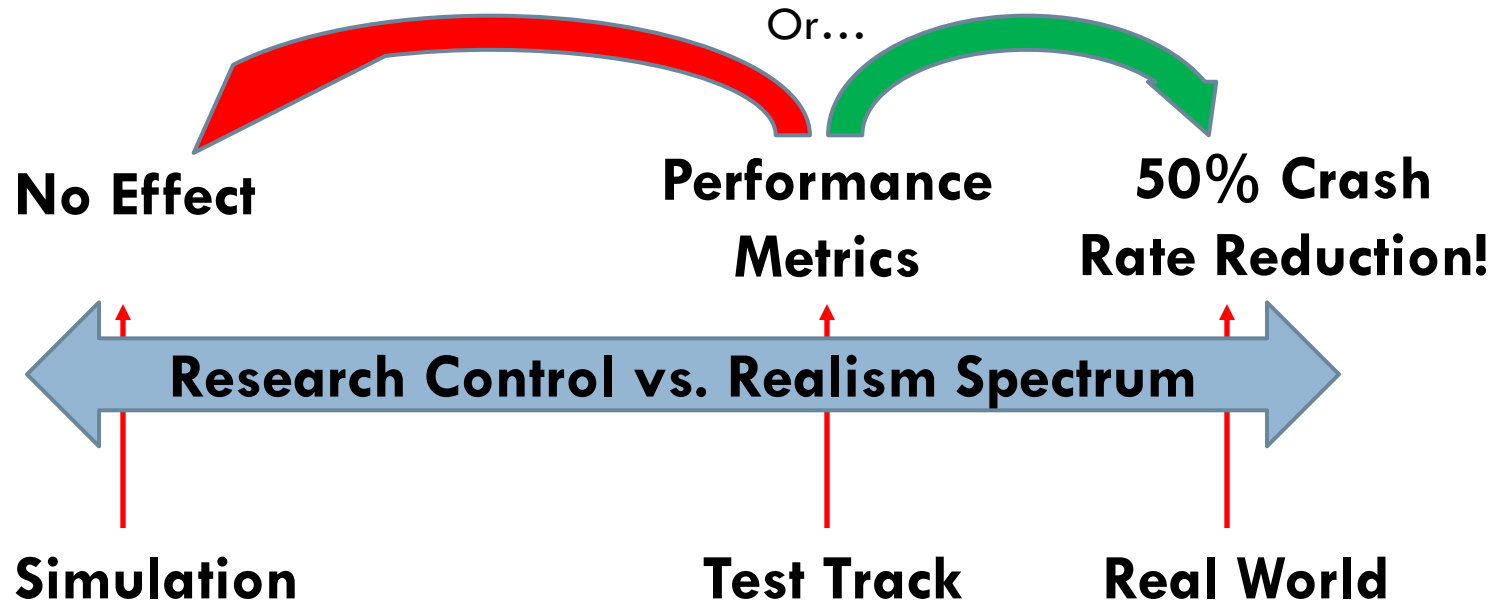
- Mixed evidence on safety benefits of brain training for senior drivers
 - ▣ Ball et al. (2010) showed speed of Processing training → 50% reduction in at-fault crashes over several years!
 - See Demo later
 - ▣ However, Gaspar et al. (2012) found no performance improvement from brain training when tested in a simulator

Peripheral Challenge : Information Processing Speed

A group of birds will briefly appear on screen. Look for the bird that is different from all the others. After the birds are gone, click where the unique bird appeared. Click START to begin.

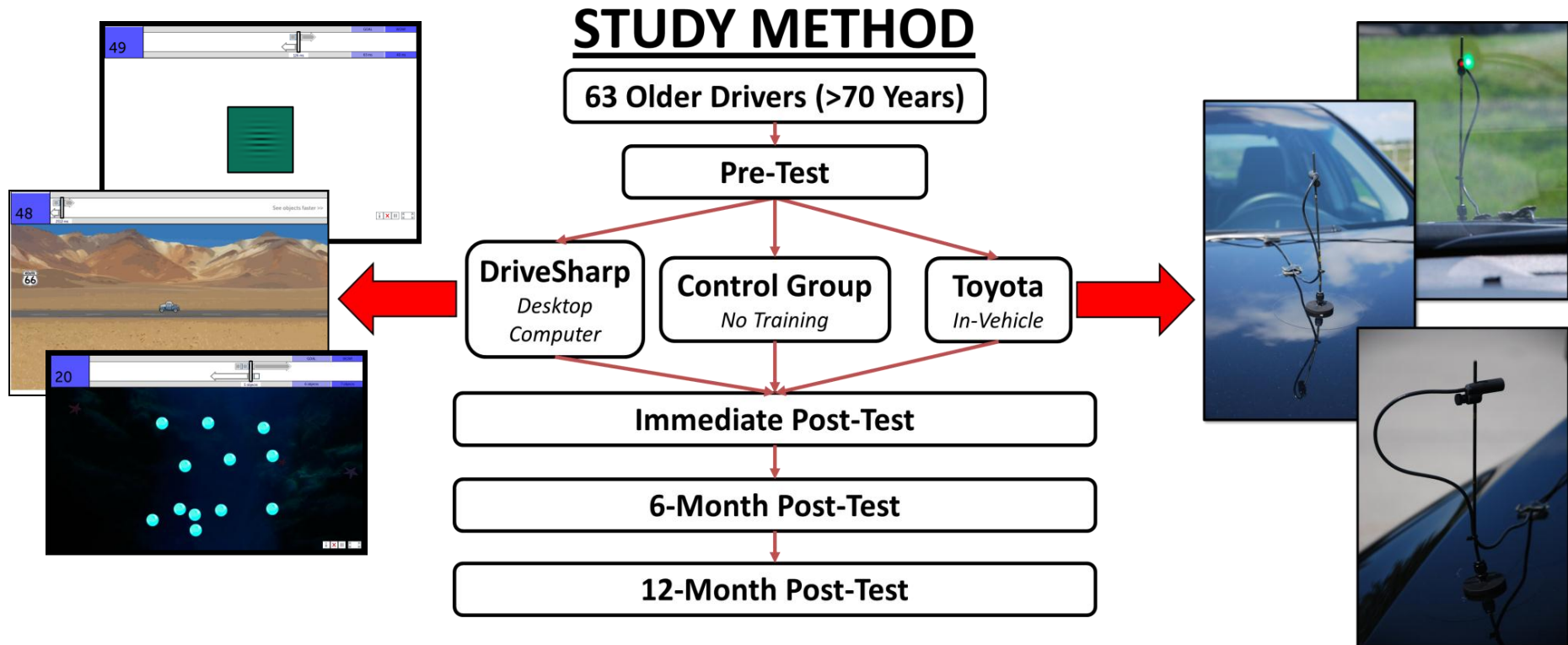


Brain Training Research @ VTTI



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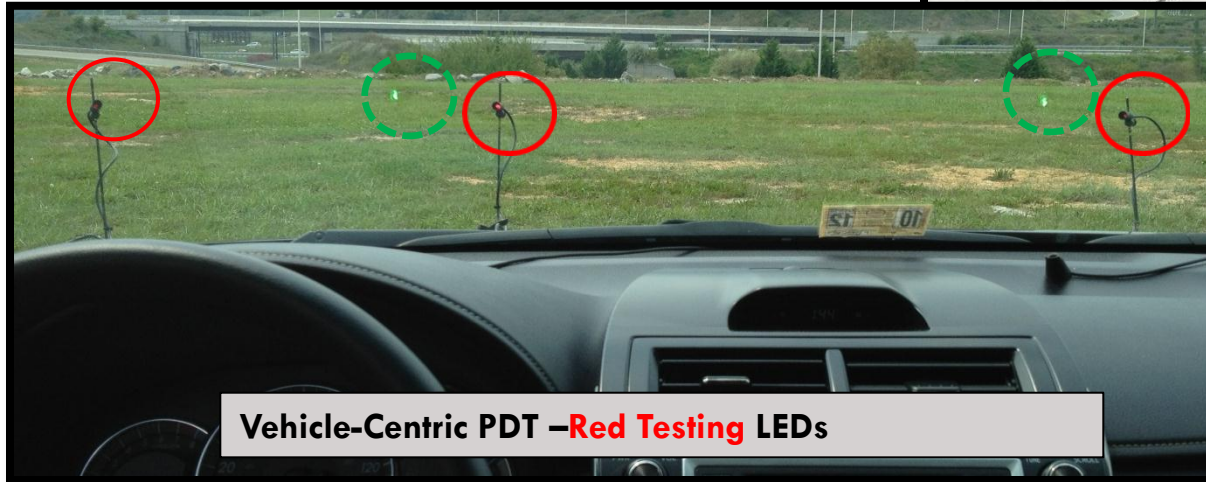
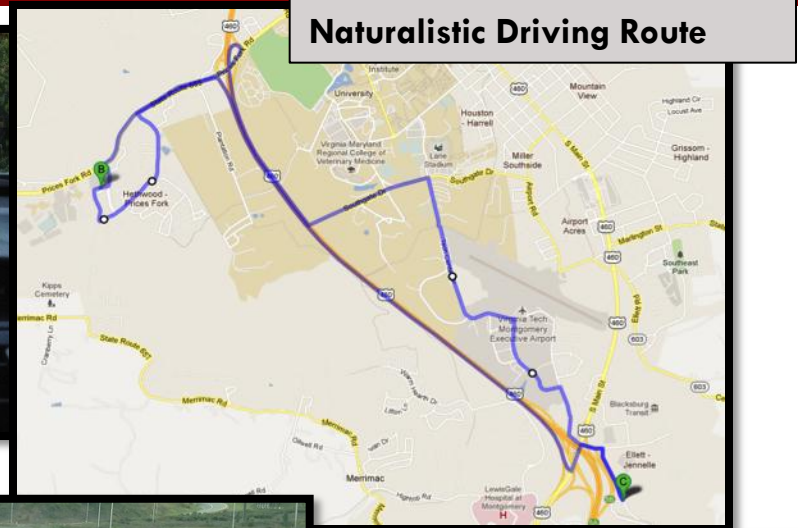
- Comparing Toyota-developed in-Vehicle System to Computer-Based Training



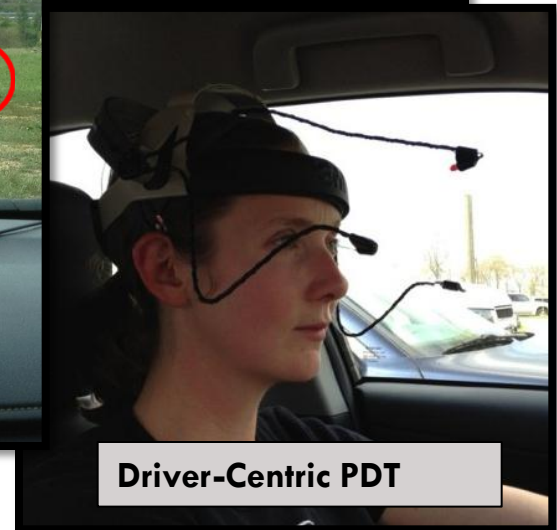
Brain Training Research @ VTTI



Virginia Smart Road – Salient Object Detection



Vehicle-Centric PDT – Red Testing LEDs

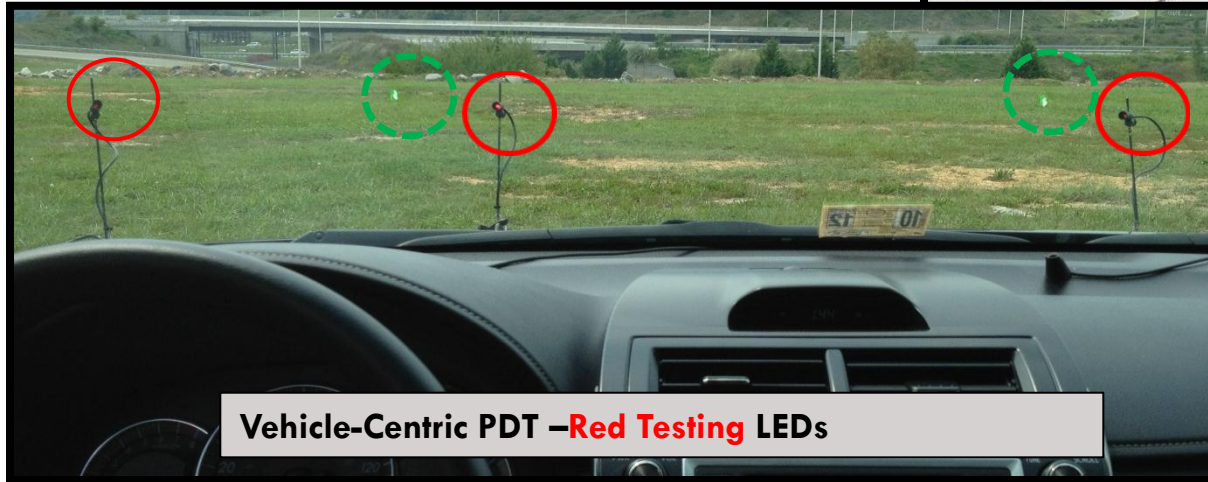
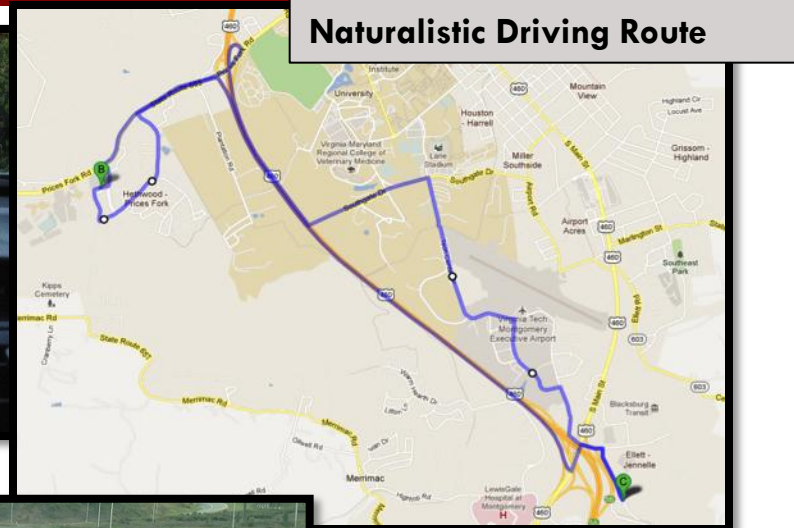


Driver-Centric PDT

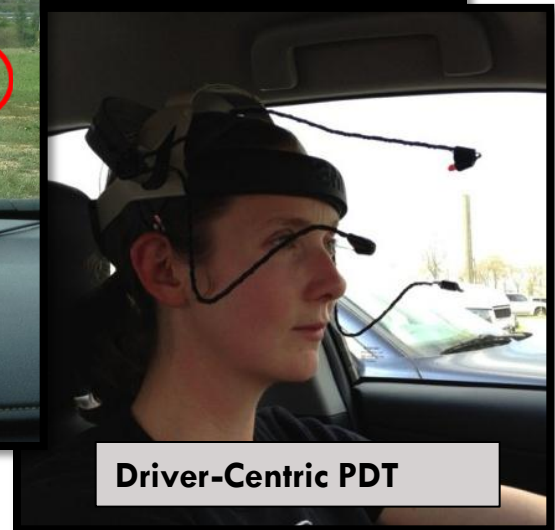
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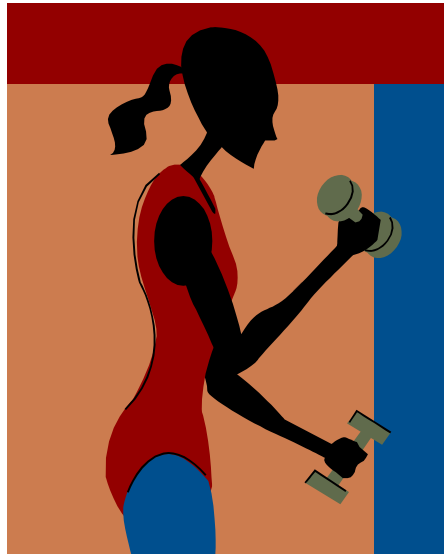


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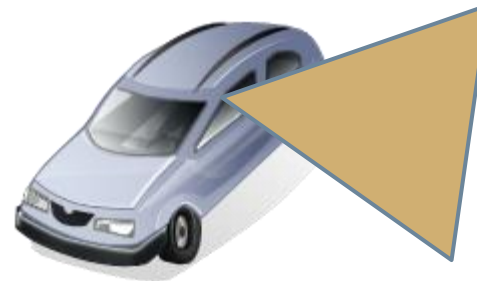
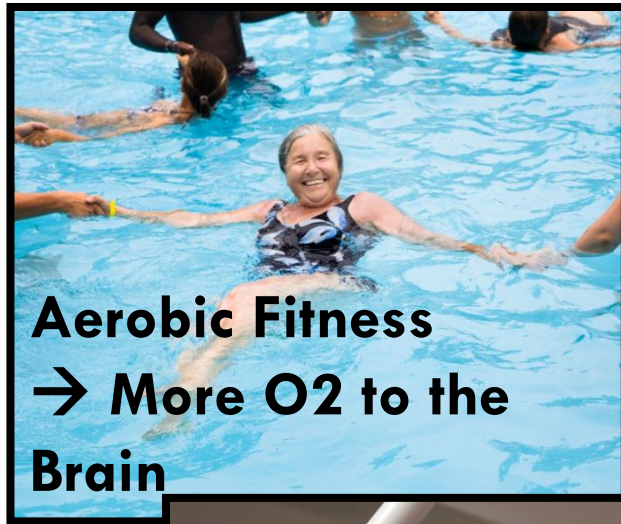
Physical Training



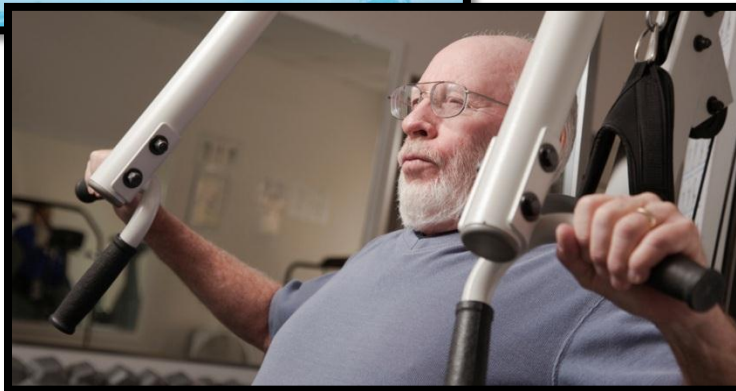
Physical Training Research

- Evidence across many studies shows potential safety benefits of physical training
- Other meta-research says maybe not in terms of cognitive benefits
- Federal Govt. (NHTSA) is looking to conduct further research in this area
- VTTI also planning related research

Specific Potential Benefits



**Greater Flexibility →
Better vision around
vehicle**



**Greater Strength →
Better control of wheel and pedals**

Summary

- Evidence across many studies shows potential driving safety benefits of training for seniors
 - ▣ Physical
 - ▣ Brain
 - ▣ Driver / Driving Safety
- Research continues
- No evidence to suggest any harm
- Benefits may go far beyond driving safety and safe mobility

