

Vision and Situational Awareness

NNJR Track Side Classroom Series



Disclaimer

The techniques shown here have been compiled from experienced sources believed to be reliable and to represent the best current opinions on driving on track. But they are advisory only. Driving at speed at Watkins Glen, or any other track, requires skill, judgment and experience. These techniques assume the reader has high performance driving knowledge and applies them as applicable to their level of driving experience.

High-performance driving can be very dangerous, carries inherent risks and may result in injury or death. NNJR and PCA make no warranty, guarantee or representations as to the absolute correctness or sufficiency of any representation contained herein. Nor can it be assumed that all acceptable safety measures are contained herein or that other or additional measures may not be required under particular or exceptional conditions or circumstances.



- Vision is much more than eyes
 - Know where and how to look
- You can see more
 - As you go faster, you must see more (to be safe)
- Easy tips to improve
 - Street, mental imagery, worksheets



NNJR Vision is More than Eyes



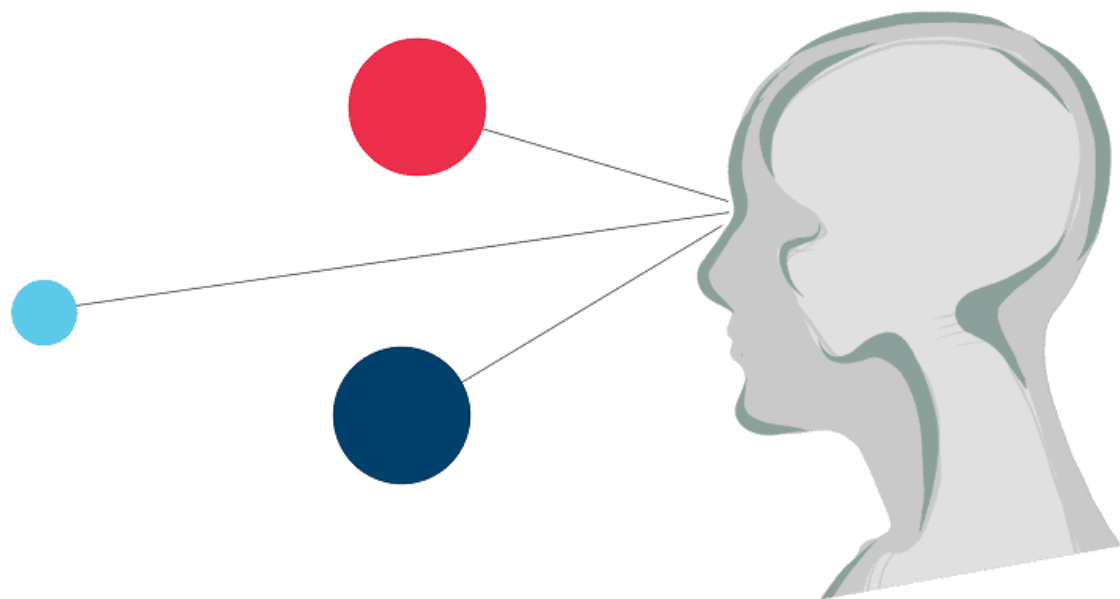
- Look/focus where we are going
- To “see” the line
 - Reference Points
- Safety
 - Situational Awareness
 - Flag stations
 - Traffic



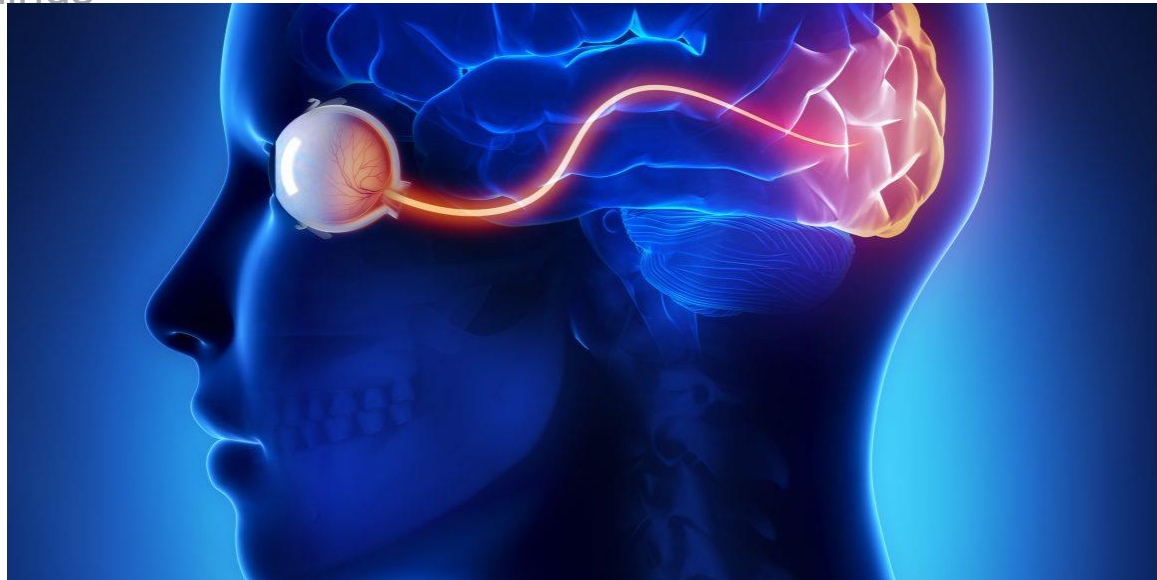
NNJR Vision Is More than Eyes



- Look/focus where we are going
- To “see” the line
 - Reference Points
- Safety
 - Situational Awareness
 - Flag stations
 - Traffic
- Depth perception
 - Speed
 - Distance



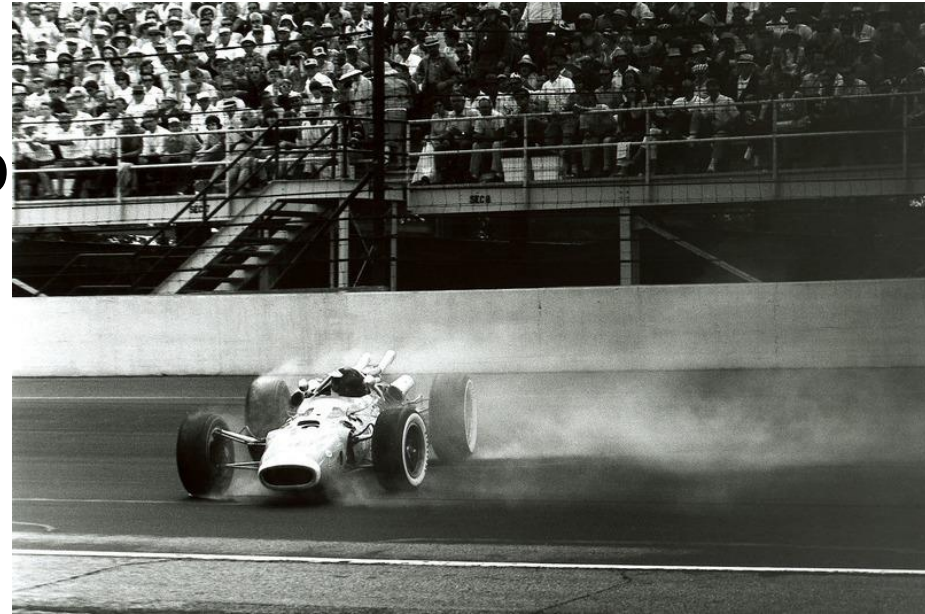
- To see where we are going (duh)
- To see the line
 - Reference Points
- To be aware of our surroundings
 - Situational Awareness
 - Flag stations
 - Traffic
- Depth perception
 - Speed
 - Distance



But

- Vision is worthless until
 - The brain processes what it sees and
 - Your hands and/or feet respond

1. Look ahead
2. Look where we want to go
3. Lots of Reference Points
4. Use peripheral vision
5. Etc.



We can do better!

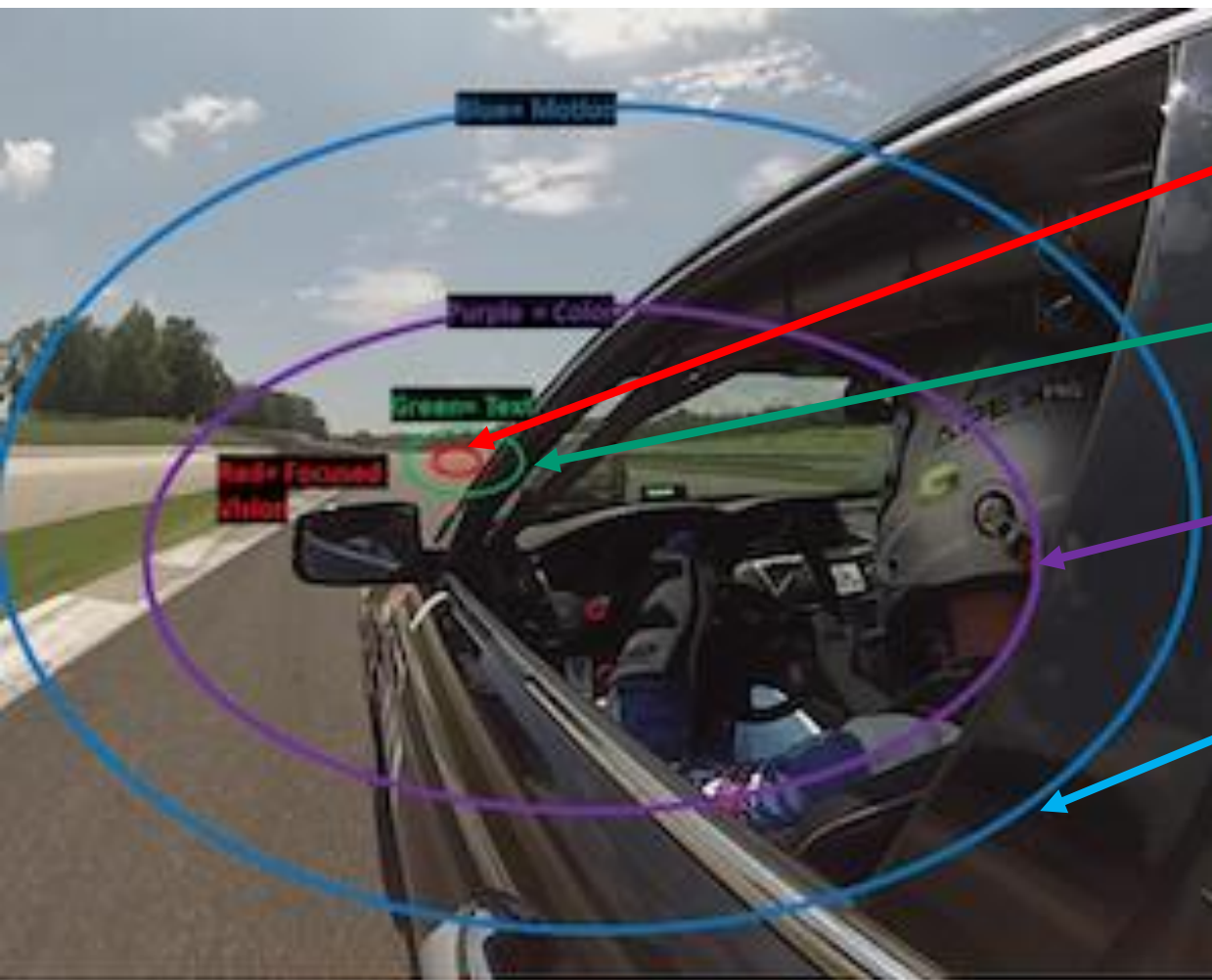
- **Focus**
 - Central vision, 1 second or more, 3-5 degrees, 3% of what we “see”
- **Peripheral**
 - Side/surround vision
- **Glance**
 - Central vision, 1/2 second or less
- **Mental**
 - Your “mind’s eye”

Source: Central Indiana PCA

NNJR How the Eyes & Brain Work



- Vision focus and “zones”*



Focus (3-5 degrees)

Text

Color

Motion

** Speed Secrets 231, Power of the Periphery, by Andrew Rains*



- Focus is small: 3% of our vision
 - Eyes move quickly (3+ times/sec)
 - Brain is slower (0.5 to 1.5+ sec)
 - Shorter: normal, expected
 - Longer: unexpected, surprise
 - We drive to focus (target)
- Text area only slightly bigger
 - Lap timers, etc. can easily disrupt
- Color is seen in much larger area
 - Warning lights, shift lights, etc.

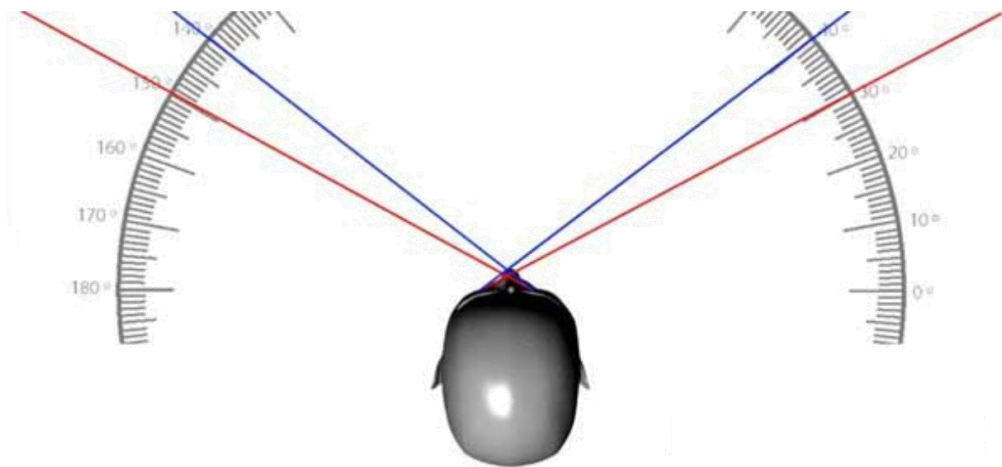


Carol M. Highsmith

NNJR “Peripheral Vision”



- Over 90% of our field of vision!
 - Less detail but sensitive to movement and contrast
- Critical on track
 - Focus ahead and use peripheral vision when close to Reference Points
 - Essential for “situational awareness”
 - Mirrors
 - Cars, objects in motion
 - Part of depth perception



NNJR How We “See” a Corner*



- A curve requires 3 points (basic geometry)
 - Our eyes need to "see" the whole corner
 - Turn your head!
 - When we see the whole corner, we have (more) confidence
- Ocular driving: primary + peripheral + memory vision
 - Can you drive blindfolded ?!?



Created by Marek Polakovic
from Noun Project

* *Dennis Macchio*



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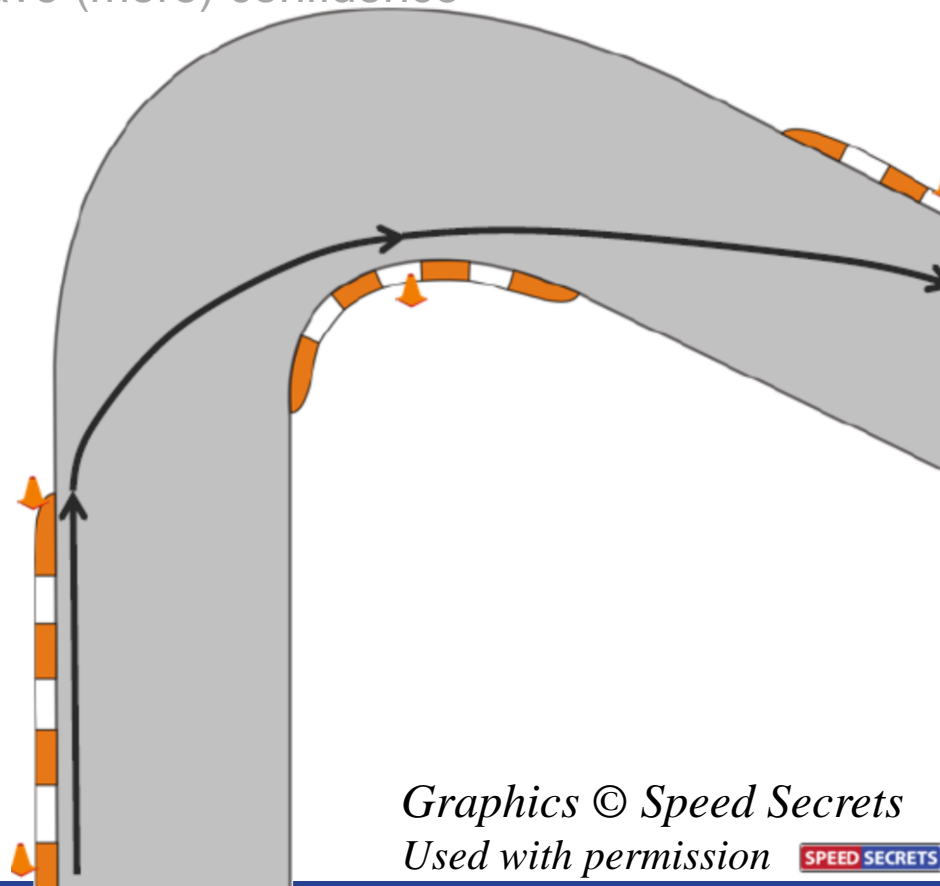
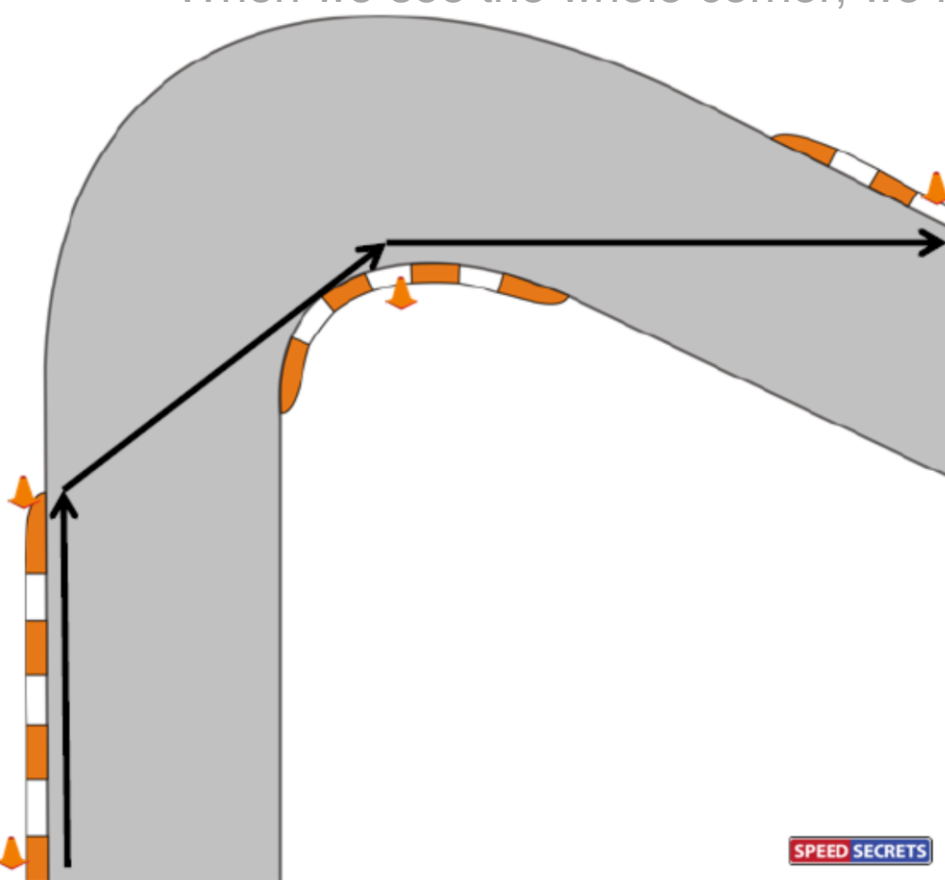


PORSCHE

NNJR How We “See” a Corner



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The Vision Process

1. **Mental Vision:** See the unseen in your “mind’s eye”
2. **Glance:** Ahead, sides, mirrors, checks
3. **Focus:** Primary “target”
4. **Peripheral:** Awareness, checks

NNJR Example



Chuck Tucker, Cayman GT4, 09/10/2017
Putnam Park, Lap 7/15
Sector – Sector 1

Total Time:
Lap Time:

0:08:19.8
00:08.3

Glance
Mental
Focus
Peripheral



Source: Central Indiana PCA



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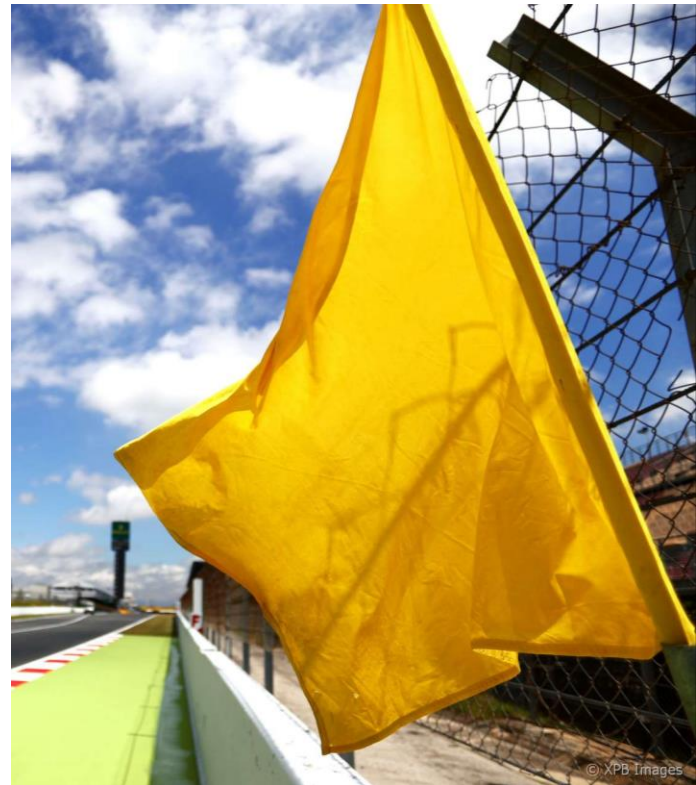
PORSCHE

- Seeing is much more than the line!
- We must see
 - Track Surface
 - Other cars
 - Flags
 - Runoff
 - ...
- A large part of vision and mental focus (brain!) must be reserved for these factors
 - “Going fast” often conflicts

NNJR One Example: Flags



- Advanced drivers often miss flags
 - Black
 - Checkered
 - Yellow !!
- There is no excuse
- Have you ever missed a flag?
 - Why?





- Critical part of Situational Awareness
 - MUST be aware of cars behind
- Should never be surprised by a car in mirror
- Scan mirrors (esp. rear view)
 - On and end of straightaway
 - Are cars closer or further away?
 - Exiting a corner
 - Confirms how close the next car is





Easy Tips to Improve On Track Vision & Situational Awareness



1. Practice on the street
 - 5 seconds, 20 seconds
 - Focus vs. glance vs. peripheral
 - Adjust mirrors!
2. Visualization / Mental Imagery
 - Develop the mental picture!
3. Deliberate Practice
 - Sensory Input Sessions



Watch later

Share

MORE VIDEOS

0:25 / 7:08

YouTube

Yes 89635.png [Show all](#)

NNJR Targets on the Street



CITY DRIVING

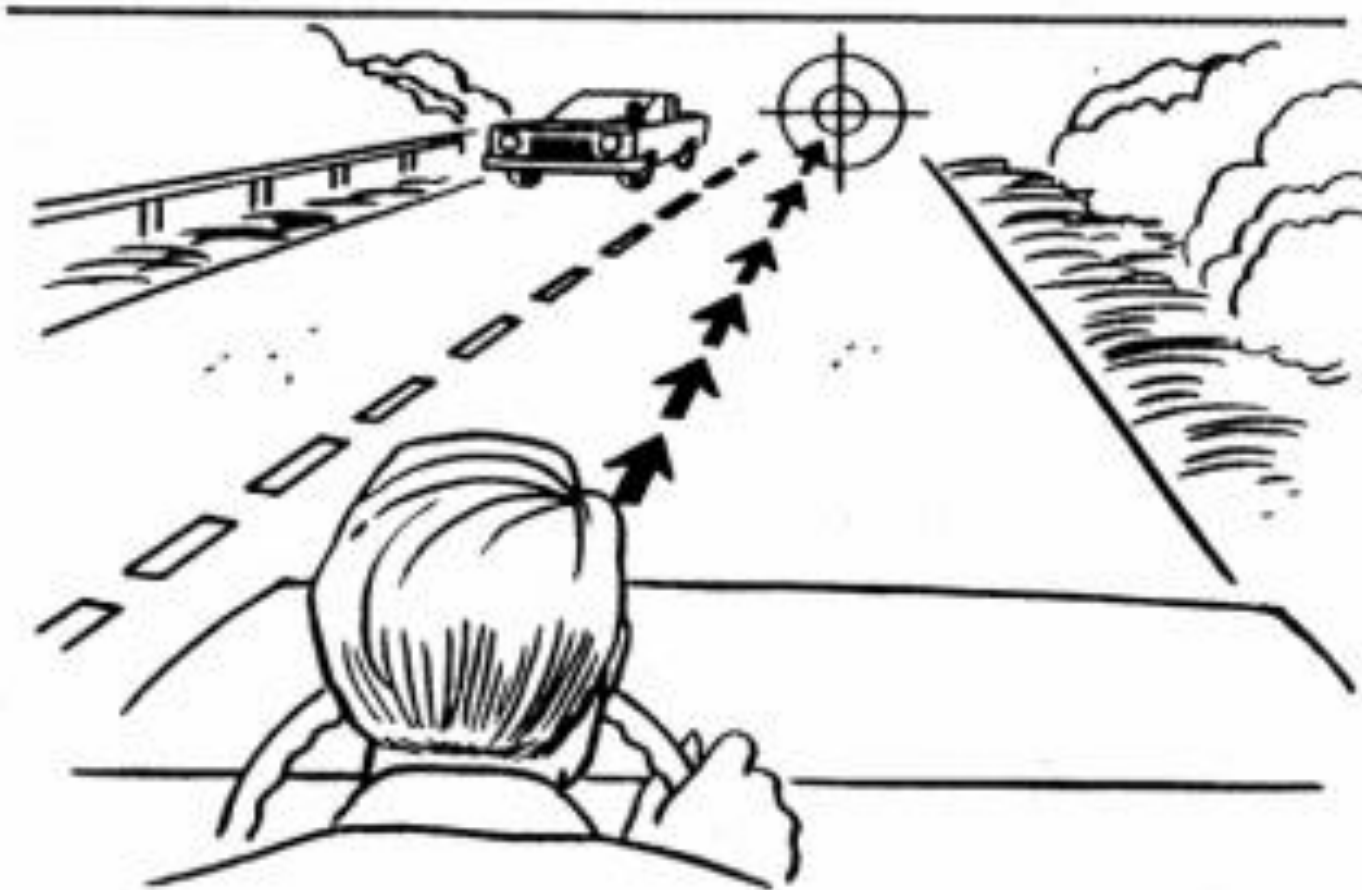
12-15 Seconds is About One Block



OPEN HIGHWAY

12-15 Seconds is About A Quarter-Mile





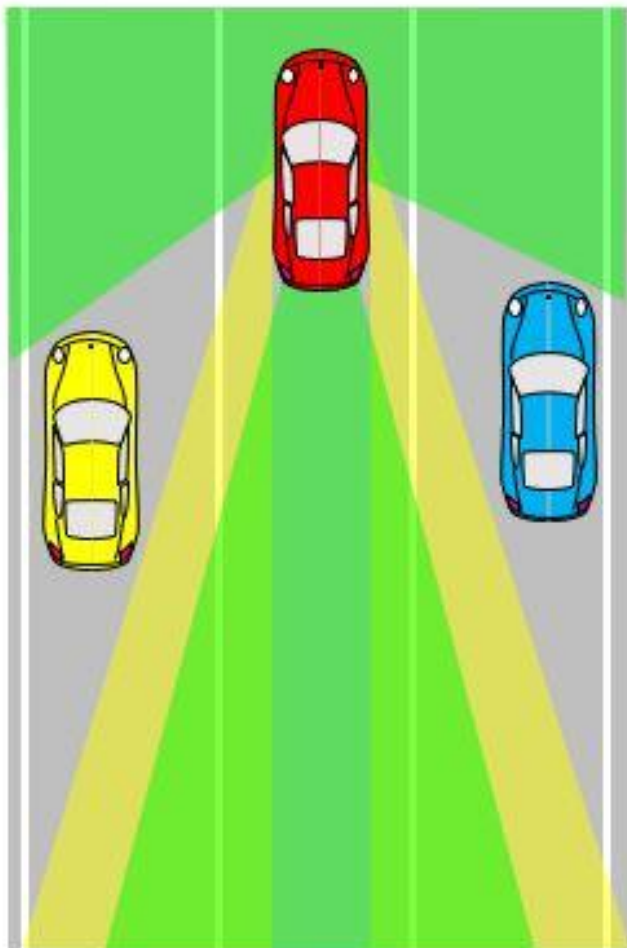
NNJR Adjust Mirrors!



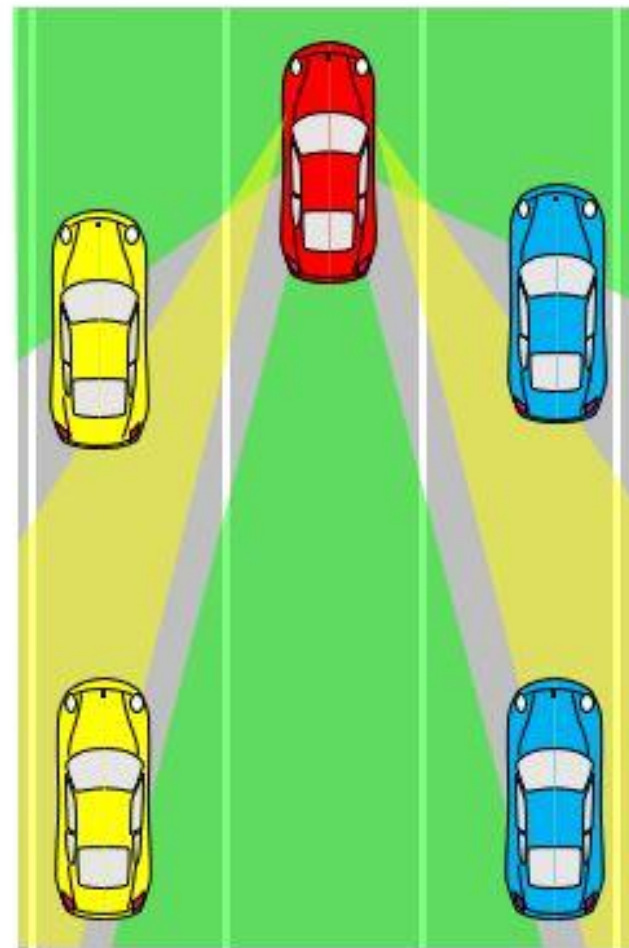
- **Start in correct seating position!**
 - Height tradeoff: up helps vision, down helps kinesthetics
- **MIRRORS**
- **Rearview Mirror**
 - Adjust to see entire rear window
- **Left Mirror**
 - Rest head against driver's window
 - Adjust to barely see left rear fender
- **Right Mirror**
 - Lean right so head is under rearview mirror
 - Adjust to barely see right rear fender



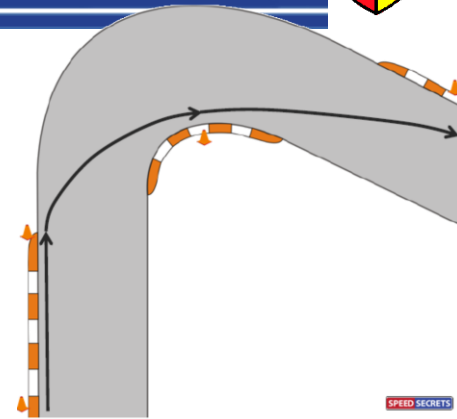
Common



Better



G. Plazer, "The Geometry of Automotive Rearview Mirrors—Why Blind Zones Exist and Strategies to Overcome Them," SAE Tech. Paper 950601 (1995).



- Develop “mental vision”*
 - A picture in your mind of entire corner
 - Including runoff, flag stations, etc.
 - Start with in-car video of corner (over & over)
 - Key: Turn video off and visualize full corner including exactly how you want to drive it. Repeat.
 - Turn your head!
 - Move your hands and feet!
 - Imagine the sound the car will be making, how it will feel, physical movements you'll be making and how you will feel

SPEED SECRET

Using all your senses while doing mental imagery is powerful - and will make you a better driver.

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*Ross Bentley Speed Secrets 212

[See Mental Imagery Guide for Drivers](#)

NNJR 3. Deliberate Practice: Vision and Situational Awareness



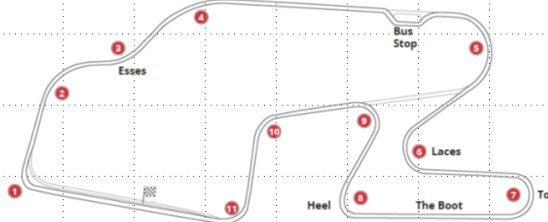
General

- Everything you see on and off the track surface
- Something new each lap
 - e.g. Horizon change during a corner
- How far ahead can you see?
- Turning your head?
- Looking around corners?

DELIBERATE PRACTICE WORKSHEET: VISION 1

General

- Everything you see on and off the track surface
 - Something new each lap
 - e.g. Horizon change during a corner
- How far ahead can you see?
- Turning your head?
- Looking around corners?
- Etc.



Write Vision notes on map immediately after session.



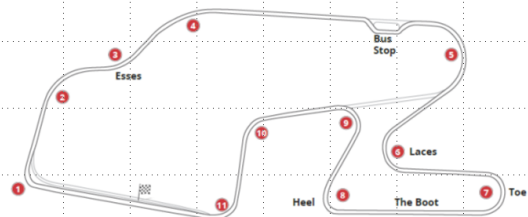
DELIBERATE PRACTICE WORKSHEET: VISION 2

Mirrors

- Adjusted properly? (no blind spots)
- How many cars behind?
 - Entering bus stop? Entering Turn 1?
- Closing speed: is car in mirror closer or further away?
- What color(s) is/are the cars behind?
- Etc.

Safety

- How soon/far ahead can I see flag stations?
- Bail out areas for each corner



Write Vision notes on map immediately after session.



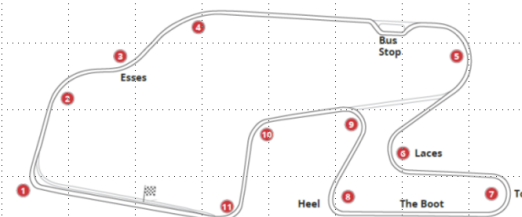
DELIBERATE PRACTICE WORKSHEET: VISION 3

Reference Points

- Not cones!
- Cracks, posts, seams, curbs, etc.
- BOB, TI, EOB, Apex, Track out, more

Track Surface

- Sealer, color changes, etc.
- Elevation
- One new feature per lap



Write Vision notes on map immediately after session.



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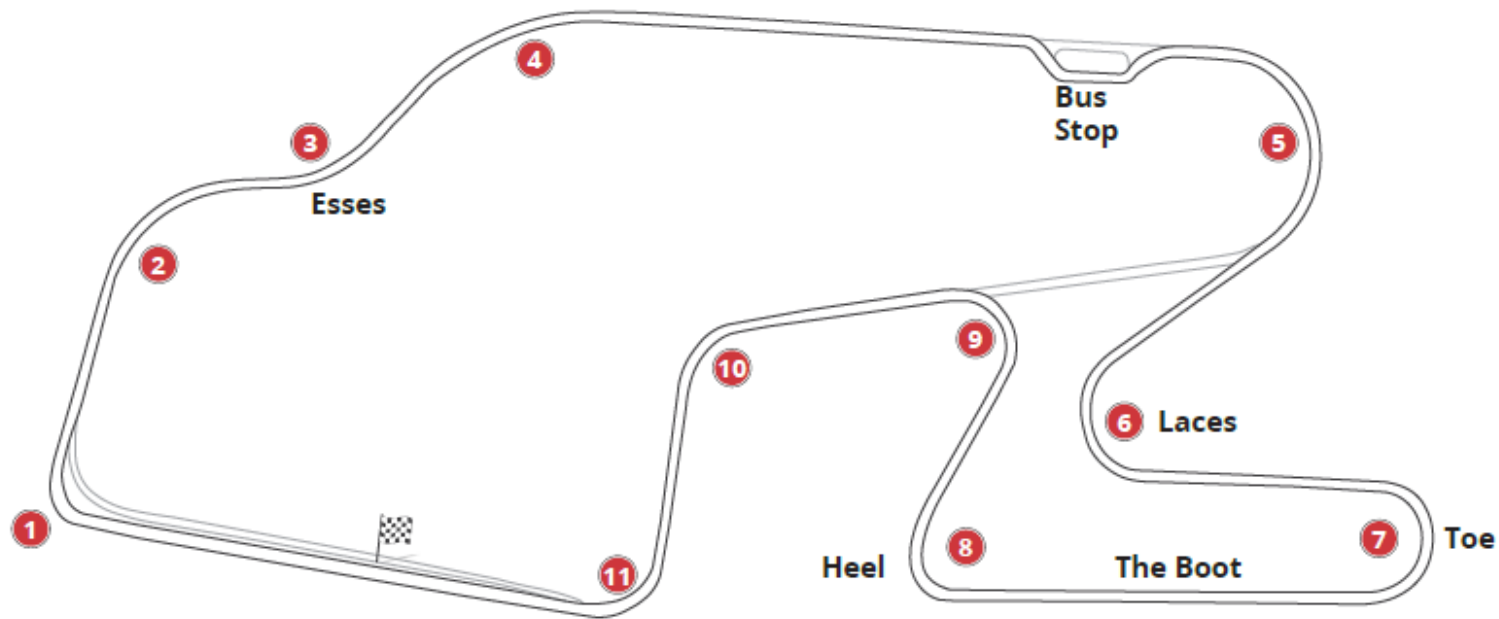
PORSCHE

DELIBERATE PRACTICE WORKSHEET: VISION 1



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 - Something new each lap
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- Etc.



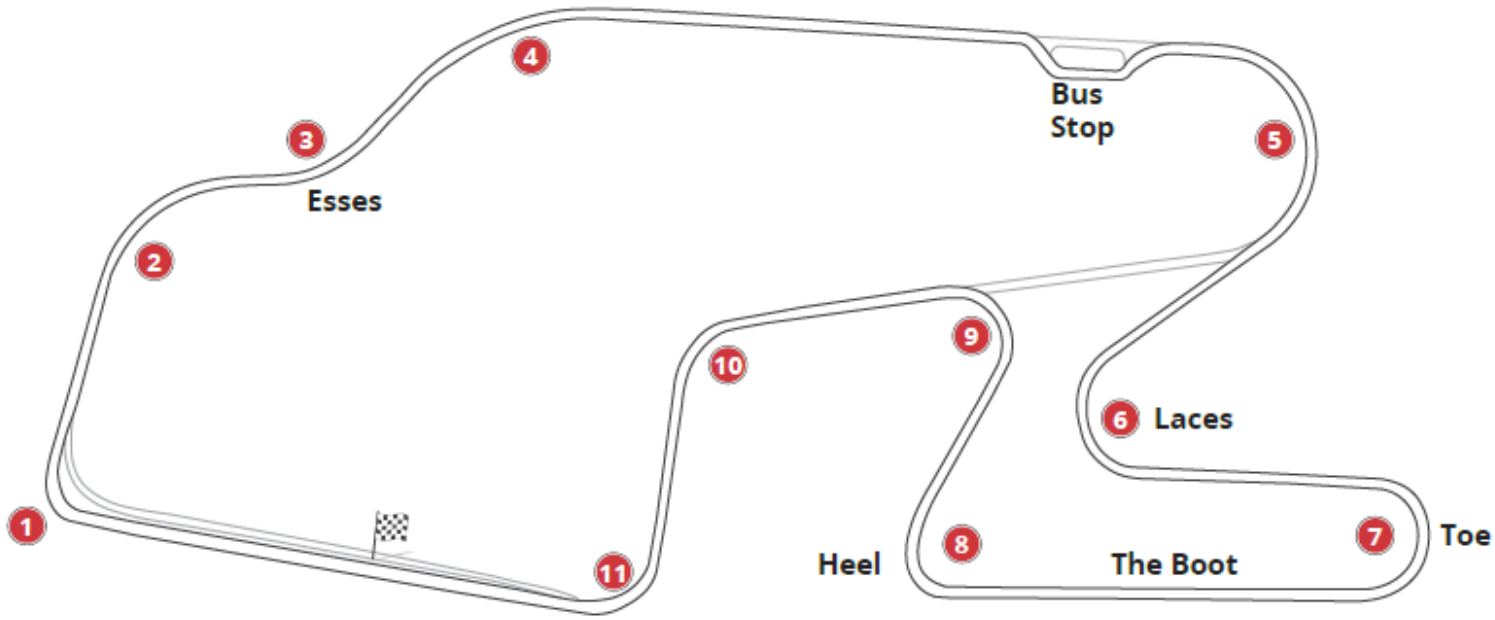


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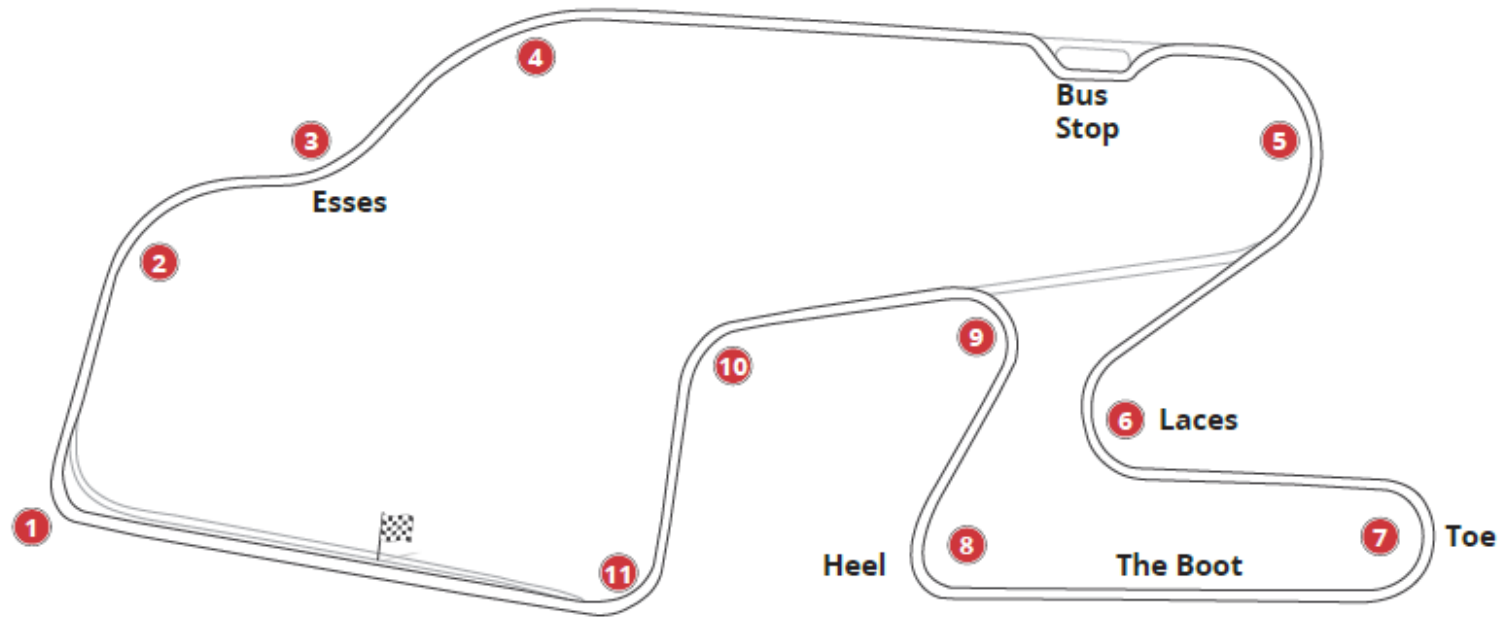


Reference Points

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Track Surface

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- <https://nnjr-pca.com/wp-content/uploads/2022/08/Sensory-Input-Worksheets-for-Vision-Watkins-Glen.pdf>



Easy Tips to Improve On-track Vision & Situational Awareness



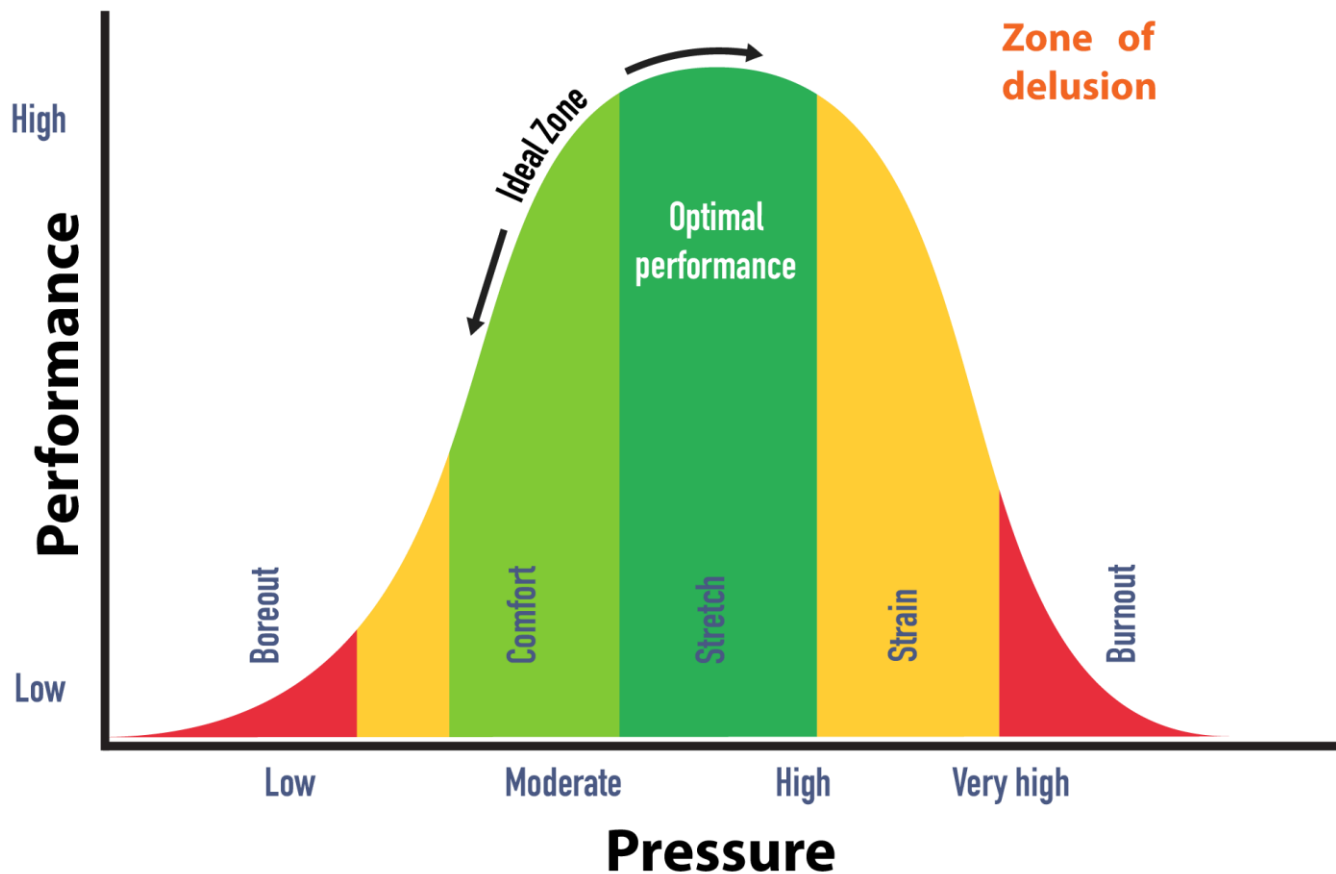
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2. Visualization
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But !!



- In a rut / lose focus
- Pressure



- Cause
 - Tunnel Vision!
 - Lose peripheral vision => Lose Awareness
 - Reaction time slows
- Don't go on track when stressed or tense
 - In staging or before, relax the body, from toes to head
 - Release tension, especially on the neck

*Speed Secrets 231, Power of the
Periphery, by Andrew Rains*

NNJR Ways to Make Vision Worse



- In a rut / lose focus
 - Pressure
 - Tired
- “Lack of sleep can make you less alert and affect your coordination, judgement, and reaction time while driving.”*
-- CDC



Photo by [Cris Saur](#) on [Unsplash](#)



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PORSCHE

NNJR Ways to Make Vision Worse



- In a rut / lose focus
- Pressure
- Tired
- Distracted



- In a rut / lose focus
- Pressure
- Tired
- Distracted



- Vision is much more than eyes
 - Know where and how to look
 - Mental, focus, glance, peripheral
- You can see more
 - As you go faster, you must see more (to be safe)
 - Flags, Traffic, “bail out” space, etc
- Easy tips to improve
 - Street, mental imagery, worksheets
- Pressure, distractions, tiredness directly reduce what you see

NNJR If You are Really Good...



- <https://www.facebook.com/wtf1official/videos/171929437071624/>
- <https://www.youtube.com/watch?v=UUXQva0y0nA>

