

***GRAY MATTER METRICS, LLC***

***LAYNE PERELLI, Ph.D.***

***Mar 25, 2021***

**PREVENTING ACCIDENTS**

**CAUSED BY FATIGUE**

**A VISION FOR THE FUTURE**

- WHY DO WE CARE ABOUT FATIGUE?
  - IT'S A "**PROBLEM**"
  - HEALTH
  - MORALE
  - RETENTION
  - PERFORMANCE
  - ACCIDENTS AND DEATHS
  - FINANCIAL DRAIN

**WHAT IF THERE WAS A FATIGUE TEST A DRIVER COULD TAKE**

**THROUGHOUT THE DAY OR NIGHT,**

**ANYWHERE,**

**AS OFTEN AS NEEDED**

**AND HE COULDN'T FAKE THE TEST !**

**TO BE PRACTICAL, THE TEST WOULD HAVE TO BE**

**EASY TO LEARN,**

**QUICK TO TAKE,**

**LANGUAGE FREE,**

**INEXPENSIVE,**

**AND**

**AVAILABLE ON ANY MOBILE DEVICE,**

**TO BE USEFUL, THE TEST WOULD HAVE TO BE**

**ACCURATE**

**AND**

**RELIABLE**

**TO BE EFFECTIVE**

**THE DRIVER WOULD HAVE TO BE**

**IDENTIFIED AS**

**IMPAIRED**

**BEFORE**

**HE PASSED OUT AND CAUSED AN ACCIDENT!**



**AND WHAT IF IN ADDITION TO FATIGUE,**

**THE SAME TEST ALSO DETECTED**

**IMPAIRMENT DUE TO**

**DRUGS,**

**ALCOHOL,**

**AND**

**AGING PROBLEMS**

**IF A TEST LIKE THIS EXISTED,**

**WOULD A COMPANY USE IT?**



*JUST IMAGINE . . . . .*

*IF A TRUCKING COMPANY DISPATCHER KNEW*

***WHENEVER***

*ANY OF HIS DRIVERS WERE*

***DANGEROUSLY FATIGUED,***

***IMPAIRED BY DRUGS, OR***

***DRUNK***

*WHAT WOULD HE DO?*

**COULD SUCH A TEST EXIST?**

**YES, AND IT'S BEING DEVELOPED BY GRAY MATTER METRICS**

**IT'S CALLED**

**CogSpeed**

**TREMENDOUS  
SOCIAL  
AND  
COMMERCIAL NEED**

**SAVES  
LIVES AND MONEY**

**ENHANCES  
PERSONAL  
WELL-BEING**

**WIDE-RANGING  
APPLICATIONS**

**AT LEAST 20  
POTENTIAL  
UNTAPPED  
MAJOR  
MARKETS**

**COMPONENTS  
AVAILABLE  
TO CREATE**

**AN ENTIRELY NEW INDUSTRY**

**REALTIME  
COGNITIVE PERFORMANCE  
MEASUREMENT**

**REVOLUTIONARY NEW  
TECHNOLOGY**

**DEVELOPED  
FOR MEASURING  
COGNITIVE PERFORMANCE**

***CogSpeed***

**NEW CAPABILITY AVAILABLE  
TO DELIVER THE TECHNOLOGY**

**THE iPad  
and  
Tablets**

***“MEASUREMENT IS THE FIRST STEP THAT LEADS TO CONTROL AND EVENTUALLY TO IMPROVEMENT.***

***IF YOU CAN'T MEASURE SOMETHING, YOU CAN'T UNDERSTAND IT.***

***IF YOU CAN'T UNDERSTAND IT, YOU CAN'T CONTROL IT.***

***IF YOU CAN'T CONTROL IT, YOU CAN'T IMPROVE IT.”***

***— H. JAMES HARRINGTON***



## ***WHAT DOES COGSPEED DO FOR YOU? YOUR COMPANY?***

- ***PREVENTS FATIGUE-RELATED ACCIDENTS***
- ***SAVES MONEY AND LIVES***
- ***IMPROVES COMPANY IMAGE AS LEADER IN SAFETY***

## ***WHAT PROBLEMS DOES COGSPEED SOLVE?***

- ***IDENTIFIES DRIVERS WHO BECOME UNFIT DUE TO FATIGUE, DRUGS, OR ALCOHOL, AND***
- ***NOTIFIES THE TRUCKING COMPANY FOR CORRECTIVE ACTION.***





# **COGSPEED TESTING SYSTEM**

- COGSPEED RELIABILITY TEST APP**
- AZURE DATABASE**
- E-MAIL ALERTING SYSTEM**
- PERFORMANCE MONITORING SYSTEM**
- ADMIN COMMAND PORTAL**

# ***CogSpeed Cognitive Performance Measurement System***

- **CogSpeed Reliability Test Web App**
- **Microsoft Azure Cloud Server - .net**
  - **MYSQL Data Base**
- **Performance Monitor Web App**
- **e-mail Alert System**
- **Admin Command Portal**
- **Commercial Web Site**

# GRAY MATTER METRICS



**CogSpeed  
SCORES**

**ALERTS**

**DRIVERS**

**CORRECTIVE ACTION**

**COMPANY  
SAFETY  
MONITOR**



# HOW DOES **CogSpeed** WORK?

**THINK OF IT AS A “SPEEDOMETER FOR THE BRAIN”**

**MEASURES COGNITIVE IMPAIRMENT,  
IE DECREASED MENTAL ALERTNESS OR ABILITY TO THINK QUICKLY DUE TO  
FATIGUE, DRUGS, ALCOHOL, BRAIN DAMAGE, SENILITY**

**HELPS VERIFY WORKERS ARE SAFE ON THEIR JOB**

**AN ADVANCED ADAPTIVE ALGORITHM COUPLED WITH SECURE DATA STORAGE  
THAT NOBODY EVER THOUGHT OF BEFORE  
VALIDATED IN MY PhD RESEARCH  
PATENTED TECHNOLOGY**

**2-MINUTE SELF-CONTAINED TEST**

- EASY TO LEARN**
- HARD TO FOOL**
- ACCURATE**

**STORES EVERY SCORE IN SECURE AZURE DATABASE**

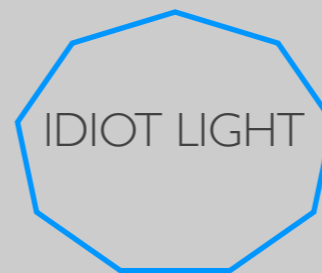
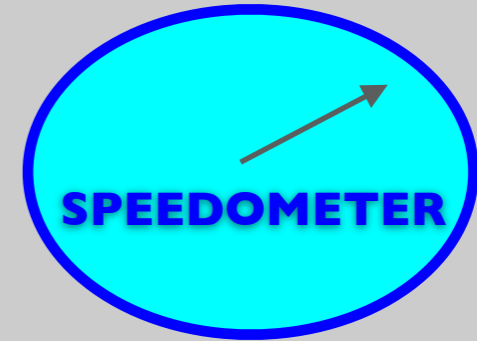
**CAN SEND ANALYTICS TO MONITORING CENTERS ANYWHERE IN THE WORLD**

O<sub>2</sub>

IGNITION SYSTEM

FUEL

### DASHBOARD

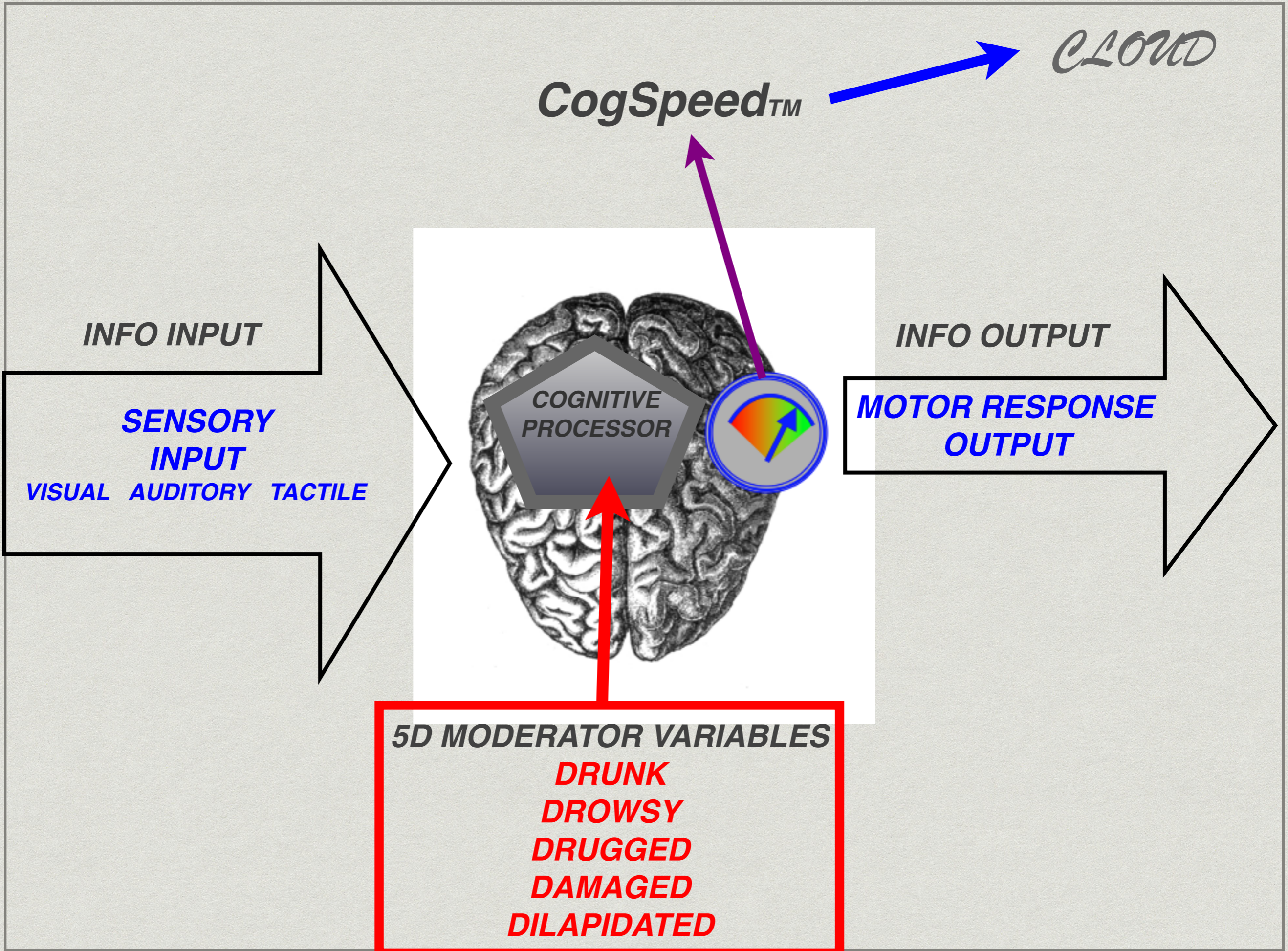


COOLING SYSTEM

LUBRICATION

WHEN YOUR SPEEDOMETER SAYS YOU'RE SLOWING DOWN BECAUSE SOMETHING IS WRONG WITH YOUR ENGINE, WHAT DO YOU CHECK?





## **THERMOMETER**

- SIMPLE**
- QUICK**
- INEXPENSIVE**
- CAN BE USED ANYWHERE**
- EFFECTIVE**
- MULTIPLE DIAGNOSTICS**

**NOTHING YET LIKE THIS FOR FATIGUE  
OR COGNITIVE IMPAIRMENT ASSESSMENT**

# **WHY ? TO SAVE LIVES**

**OUR TECHNOLOGY ADDRESSES AN URGENT ISSUE FOR SOCIETY:  
IDENTIFIES COGNITIVE IMPAIRMENT CAUSED BY**

**- FATIGUE**

**- ALCOHOL**

**- DRUGS - PRESCRIPTION AND RECREATIONAL**

**- BRAIN TRAUMA/CONCUSSION**

**- SENILITY**

**COGSPEED  
TEST SCORE**

**FATIGUE  
BLOOD ALCOHOL LEVEL  
DRUGS  
BRAIN TRAUMA  
SENILITY**

**SUBJECTIVE  
FEELINGS  
OF COMPETENCE**

**ACTUAL ABILITY  
TO PERFORM  
ON THE JOB**

- TWO APPROACHES
  - 1. TRY TO MINIMIZE FATIGUE, REDUCE THE PROBLEM
  - BUT WHAT IF FATIGUE **STILL EXISTS?**
    - HOW DO YOU KNOW?
  - IDENTIFY AND ATTACK THE PROBLEM !
  - 2. IDENTIFY ANY COGNITIVE DEFICIT (INCLUDING FATIGUE) **WHEN IT OCCURS**

# WHO ARE OUR CUSTOMERS?

**AT LEAST TEN DISTINCT VERTICALS:**

**TRANSPORTATION INDUSTRIES**

**HAZARDOUS WORK ENVIRONMENTS**

**CONSUMERS - PERSONAL USE**

**MEDICAL MALPRACTICE**

**DRUG EFFECTS**

**SENIORS**

**SPORTS**

**EDUCATIONAL INSTITUTIONS**

**RESEARCH**

**GOVERNMENT  
MILITARY**

# **APPLICATIONS IN TRANSPORTATION INDUSTRY**

**TRUCKING**

**COACH DRIVERS**

**BUS DRIVERS**

**METRO/LIGHT RAIL**

**MARITIME**

**RAILROADS**

**AIRLINES**

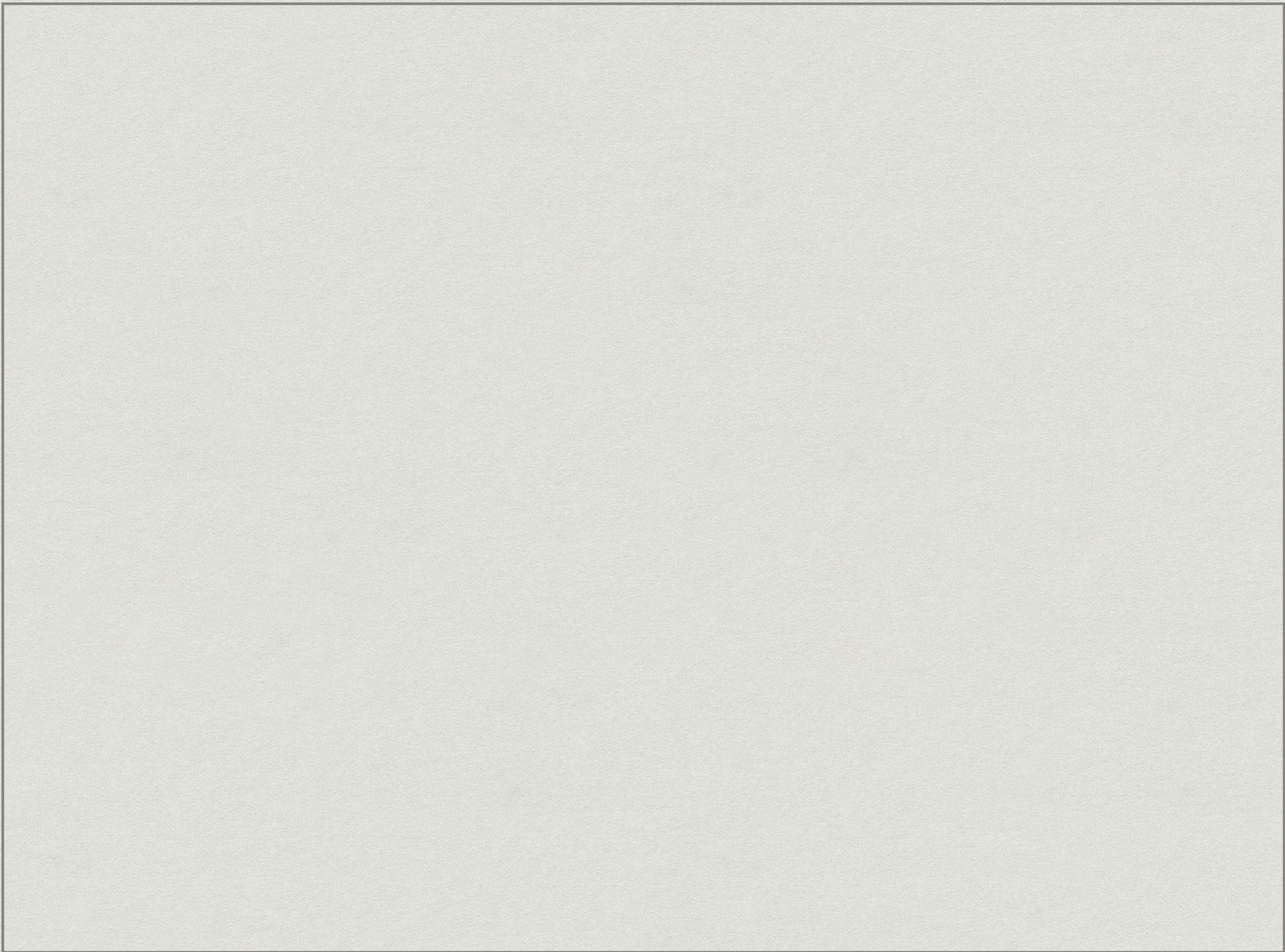
**INSURANCE INDUSTRY - RATE ADJUSTMENTS**

**FEDERAL DEPARTMENT OF TRANSPORTATION**

**DRIVERS LICENSE FITNESS DECISIONS**

**CHILDREN OF AGING PARENTS**

**DRIVER QUALIFICATION SCREENING - STATE DOT**







graymattermetrics



# CogSpeed



**Test Now!**

## Select your Test Mode

Test Interval Mode    1 2 3 4 5 6

Performance Monitoring Mode

Standard Mode

**On Demand**

Ok



# CogSpeed



**Test Now!**

-18

-12

Time Asleep

10 00 PM Yesterday

Time Awake

6 00 AM Today

Hours in Bed: 8:00

Sleep Quality: Restless



Skip

Ok

-18 | -12 | -6

Time Asleep

2 30 AM

Today

Time Awake

6 30 AM

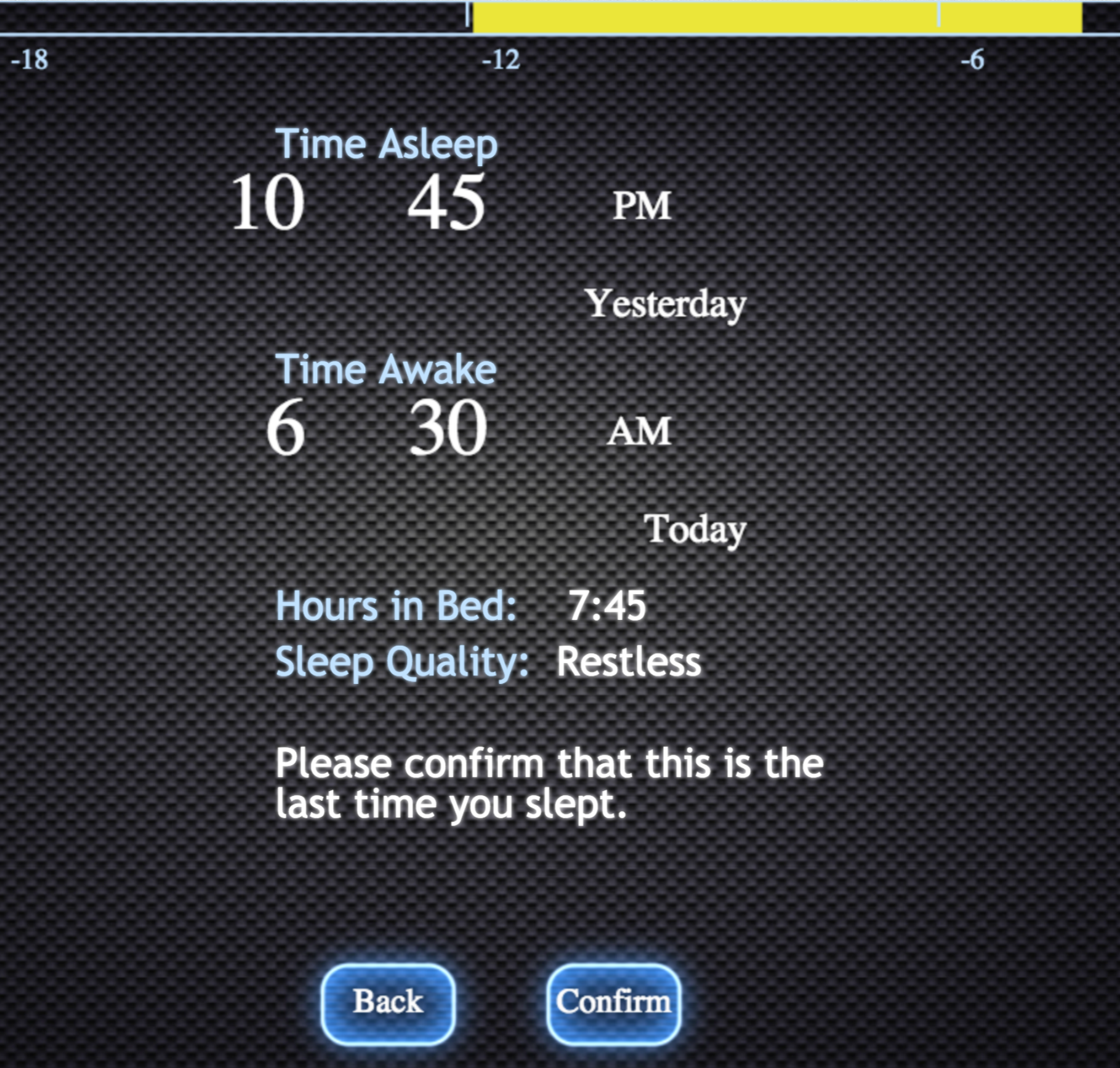
Today

Hours in Bed: 4:00

Sleep Quality: Poor

Skip Ok



Select how you feel right at this moment

**7. FULLY ALERT, WIDE AWAKE**

**6. VERY LIVELY, RESPONSIVE, BUT NOT AT PEAK**

**5. OKAY, ABOUT NORMAL**

**4. LESS THAN SHARP, LET DOWN**

**3. FEELING DULL, LOSING FOCUS**

**2. VERY DIFFICULT TO CONCENTRATE, GROGGY**

**1. UNABLE TO FUNCTION, READY TO DROP**

Ok



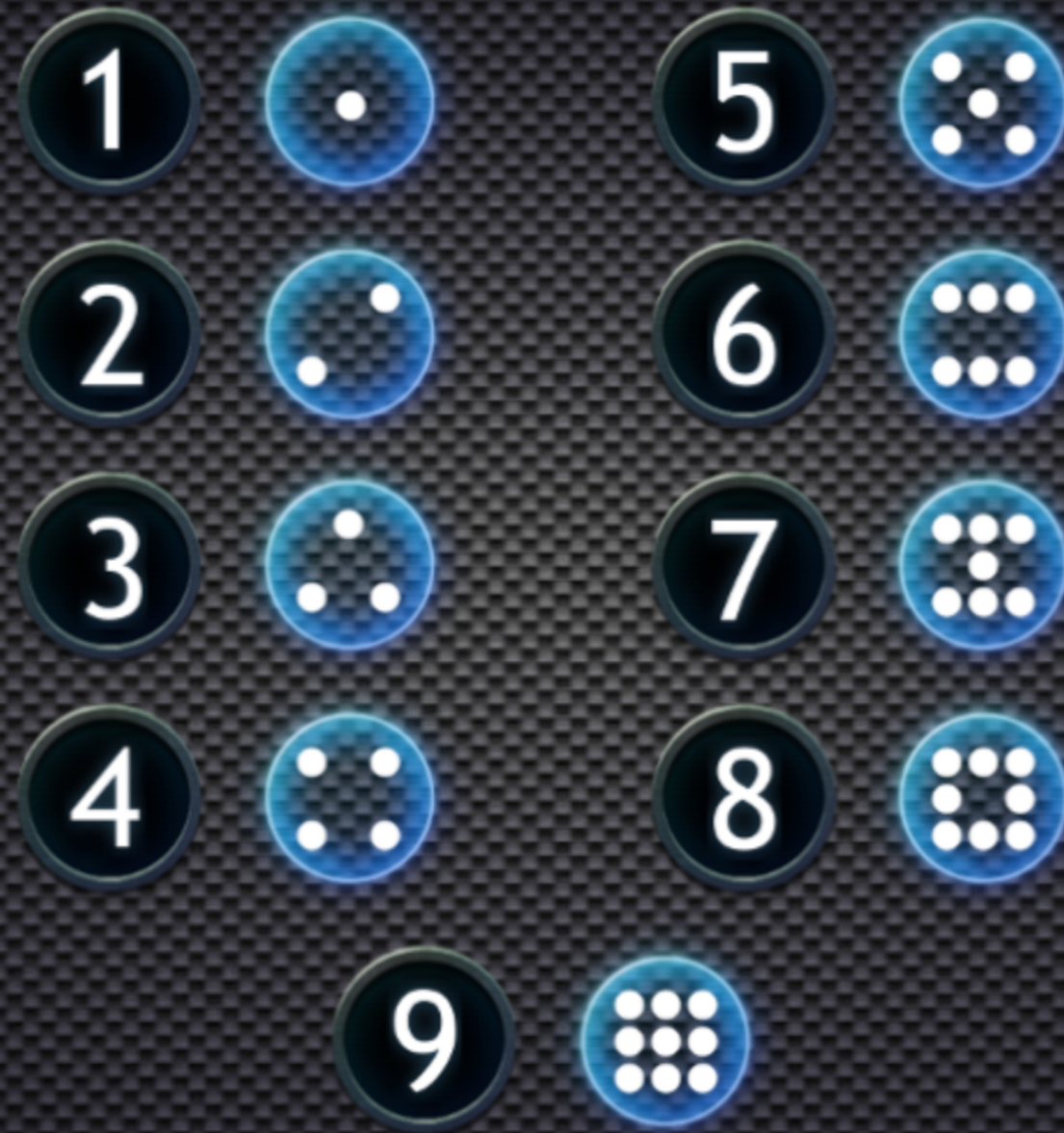
Take this test only when you're  
in a safe condition to do so.

Ready?

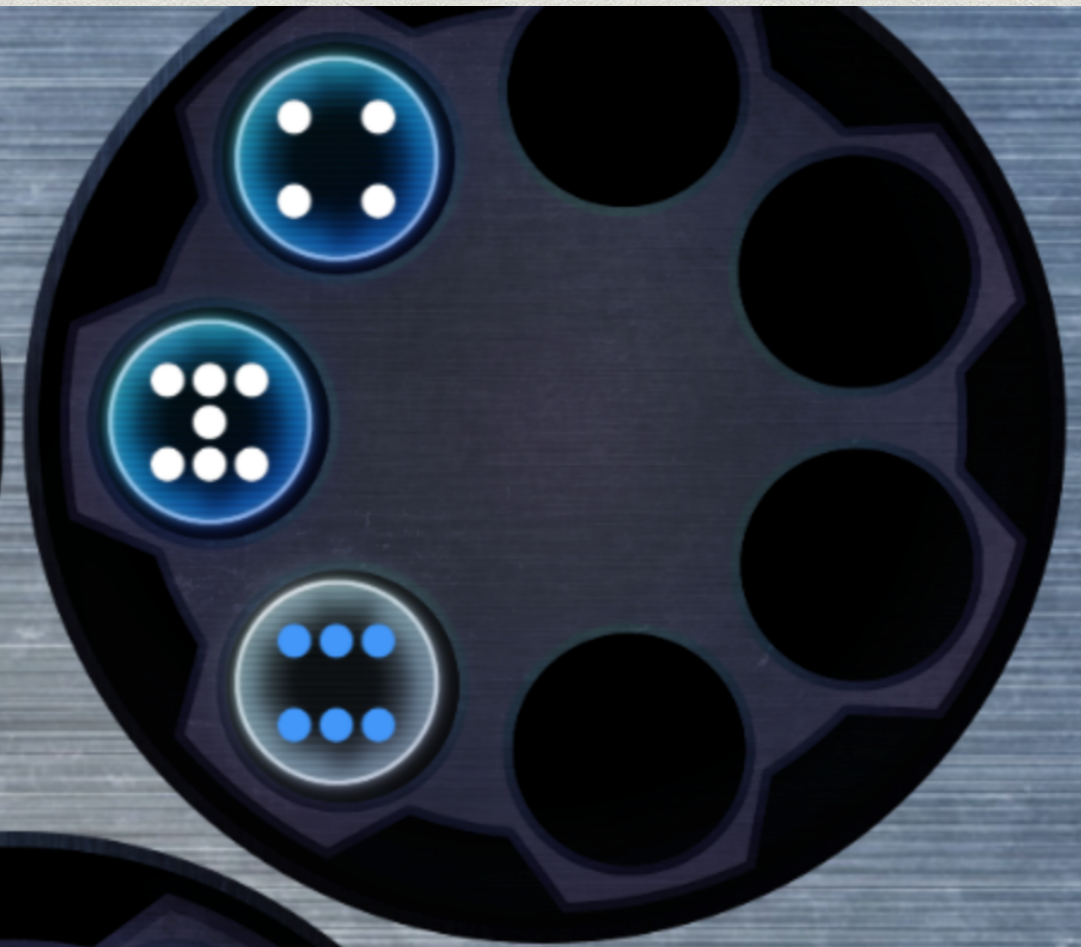
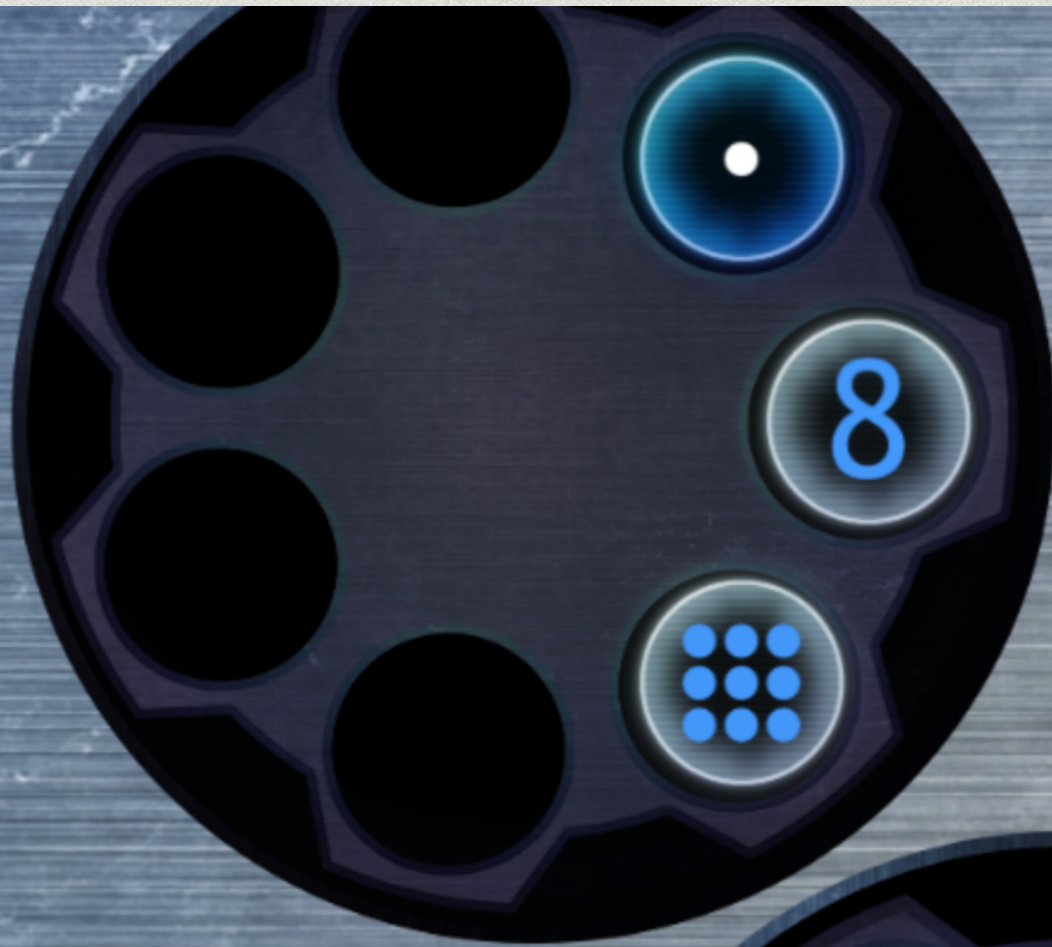
No

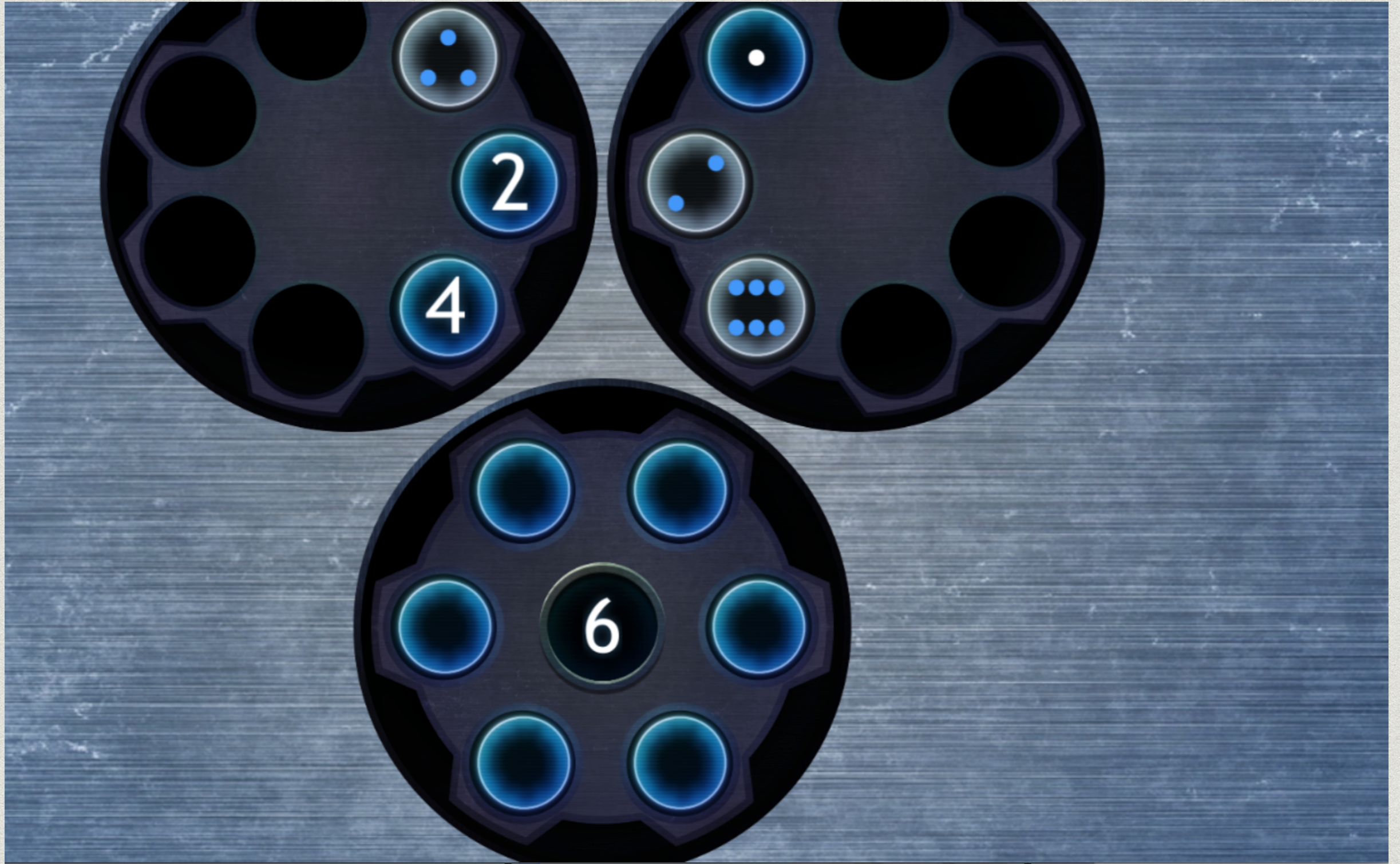
Yes

Think Fast!











Test Complete!

Analyzing..





**NO SCORE:**

**User Not Responding**



**Retest**



Test Complete!

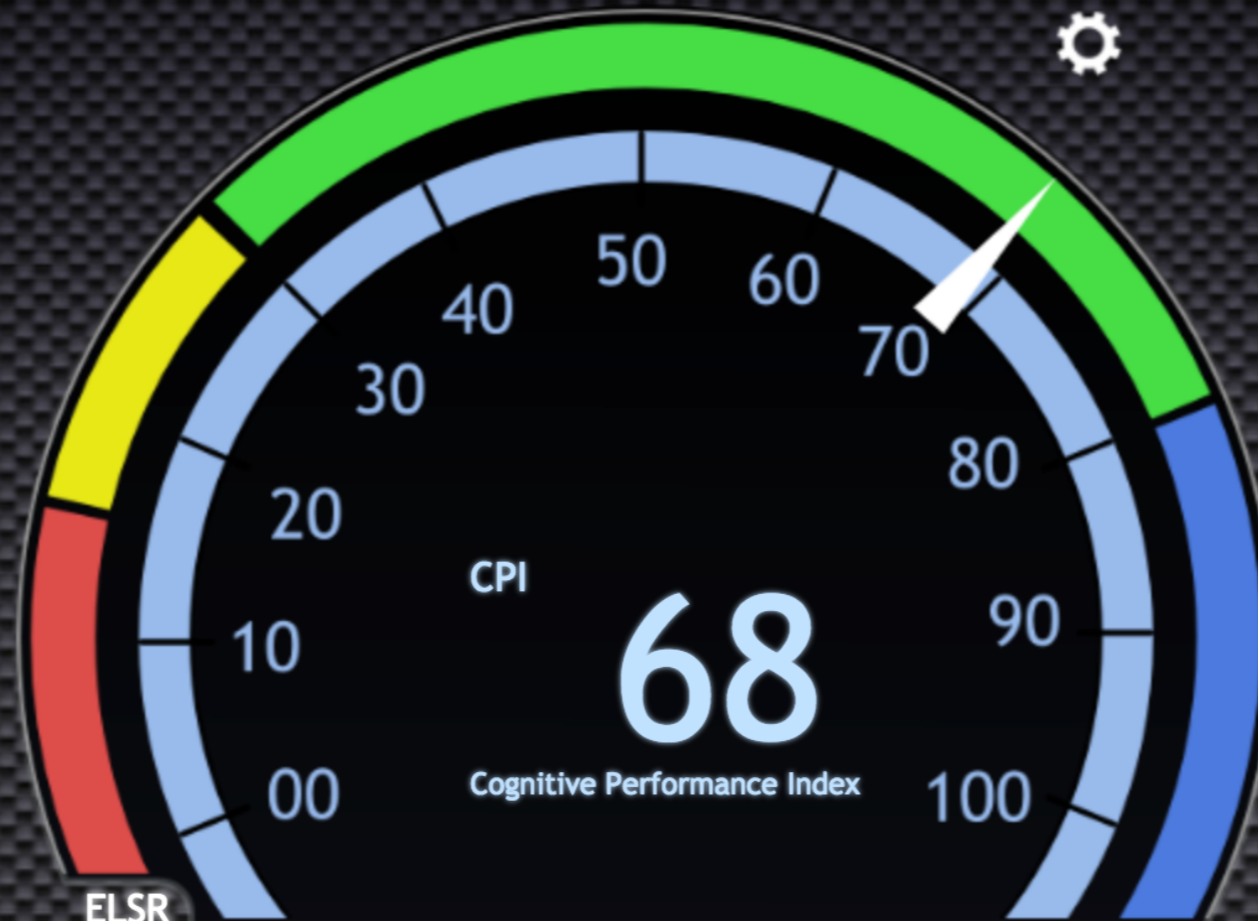
Success



Tap to Show Results



CPI 69 - 60  
Seem OK, PASSABLE.



ELSR

1 2 3 4 **5** 6 7

Energy Level Self Report

Slept

6h 58m 

Last Test

1/26/2015  
10:32 AM

Awake

5h 1m 

Next Test

N/A

Home

Set your timer for Next Test:

12:36 PM

Ok

CogSpeed v1.00.006

User Name: trucker1  
2015-01-09\_16:35:20  
Test Mode: INTERVAL  
Screen Resolution: 600x960  
Geoloc: (lat: 29.4265782, long: -98.493374)

ELSR: 5  
BRD: 944.0614000007511  
IPR: 1.0592531375599135  
CPI: 74.56708500798847 (VALID)

Test 1  
2015-01-09\_16:35:20  
Endcode: COMPLETE  
Test Duration: 52sec  
BRD: 944ms, Self Pace ms: 994ms  
Block Delta: 100ms  
Block Range: 100, ( 894 -> 994 )  
Block Count: 2

Correct Response Time - Mean: 522.08ms  
Correct Response Time - Standard Deviation: 462.1477

000	s:0	(3),4,N,(9),5,(1) F->5	Correct This,t: 3323ms,r: n/a,d: 3325ms	
	0	Time: 3324, Input:5		
001	s:0	O,U,7,(5),(3),(X) S->7	Correct This,t: 1025ms,r: n/a,d: 1028ms	
	0	Time: 1025, Input:7		
002	s:0	5,(2),6,W,(9),(3) W->2	Correct This,t: 994ms,r: n/a,d: 994ms	
	0	Time: 993, Input:2		
003	s:0	6,(4),5,(X),(7),2 F->5	Correct This,t: 954ms,r: n/a,d: 954ms	
	0	Time: 954, Input:5		
004	s:0	3,(2),(4),X,8,(1) E->8	Correct This,t: 1056ms,r: n/a,d: 1056ms	
	0	Time: 1056, Input:8		
005	s:1	1,(3),2,(8),(6),O W->2	Correct This,t: 851ms,r: n/a,d: 852ms	
	0	Time: 851, Input:2		
006	s:1	5,7,(4),(3),(6),2 U->4	Correct This,t: 968ms,r: n/a,d: 968ms	
	0	Time: 968, Input:4		
007	s:1	5,2,S,(3),(7),(6) S->7	Correct This,t: 1047ms,r: n/a,d: 1048ms	
	0	Time: 1048, Input:7		
008	s:1	(W),S,X,N,(U),(E) 2->W	Correct This,t: 1048ms,r: n/a,d: 1048ms	
	0	Time: 1048, Input:W		
009	s:1	(8),(9),(1),3,5,7 T->3	Correct This,t: 1040ms,r: n/a,d: 1041ms	[1,1,1,1,1,1,1] (100%)
	0	Time: 1040, Input:3		
010	s:2	(7),(9),(3),4,1,8 U->4	No Input,t: n/a,r: n/a,d: 1052ms,tD: 1044ms	[1,1,1,1,1,1,0] (87%)
011	s:2	5,(3),(7),8,4,(2) E->8	Correct This,t: 27ms,r: 0.03,d: 29ms,tD: 1044ms	[1,1,1,1,1,1,0,1] (87%)
	0	Time: 28, Input:8		
012	s:2	5,(7),(1),8,(X),2 F->5	No Input,t: n/a,r: n/a,d: 1032ms,tD: 1019ms	[1,1,1,1,1,0,1,0] (75%)
013	s:2	N,F,(S),(E),(T),O 3->T	Correct Last,t: 86ms,r: 0.08,d: 86ms,tD: 1019ms	[1,1,1,1,0,1,0,1] (75%)
	0	Time: 86, Input:N		

CogSpeed v1.00.006

User Name: TRUCKER1

2015-01-09\_16:35:20

Test Mode: INTERVAL

Screen Resolution: 600x960

Geoloc: (lat: 29.4265782, long: -98.493374)

ELSR: 5

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IPR: 1.0592531375599135

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Test 1

2015-01-09\_16:35:20

Endcode: COMPLETE

Test Duration: 52sec

BRD: 944ms, Self Pace ms: 994ms

Block Delta: 100ms

Block Range: 100, ( 894 -> 994 )

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Correct Response Time - Standard Deviation: 462.1477

000 s:0 (3),4,N,(9),5,(1) F->5 Correct This,t: 3323ms,r: n/a,d: 3325ms  
0 Time: 3324, Input:5

001 s:0 O,U,7,(5),(3),(X) S->7 Correct This,t: 1025ms,r: n/a,d: 1028ms  
0 Time: 1025, Input:7

002 s:0 5,(2),6,W,(9),(3) W->2 Correct This,t: 994ms,r: n/a,d: 994ms  
0 Time: 993, Input:2

003 s:0 6,(4),5,(X),(7),2 F->5 Correct This,t: 954ms,r: n/a,d: 954ms  
0 Time: 954, Input:5

004 s:0 3,(2),(4),X,8,(1) E->8 Correct This,t: 1056ms,r: n/a,d: 1056ms  
0 Time: 1056, Input:8

005 s:1 1,(3),2,(8),(6),O W->2 Correct This,t: 851ms,r: n/a,d: 852ms  
0 Time: 851, Input:2

006 s:1 5,7,(4),(3),(6),2 U->4 Correct This,t: 968ms,r: n/a,d: 968ms  
0 Time: 968, Input:4

007 s:1 5,2,S,(3),(7),(6) S->7 Correct This,t: 1047ms,r: n/a,d: 1048ms  
0 Time: 1048, Input:7

008 s:1 (W),S,X,N,(U),(E) 2->W Correct This,t: 1048ms,r: n/a,d: 1048ms  
0 Time: 1048, Input:W

009 s:1 (8),(9),(1),3,5,7 T->3 Correct This,t: 1040ms,r: n/a,d: 1041ms [1,1,1,1,1,1,1] (100%)  
0 Time: 1040, Input:3

010 s:2 (7),(9),(3),4,1,8 U->4 No Input,t: n/a,r: n/a,d: 1052ms,tD: 1044ms [1,1,1,1,1,1,0] (87%)

011 s:2 5,(3),(7),8,4,(2) E->8 Correct This,t: 27ms,r: 0.03,d: 29ms,tD: 1044ms [1,1,1,1,1,1,0,1] (87%)  
0 Time: 28, Input:8

012 s:2 5,(7),(1),8,(X),2 F->5 No Input,t: n/a,r: n/a,d: 1032ms,tD: 1019ms [1,1,1,1,1,0,1,0] (75%)

013 s:2 N,F,(S),(E),(T),O 3->T Correct Last,t: 86ms,r: 0.08,d: 86ms,tD: 1019ms [1,1,1,1,0,1,0,1] (75%)  
0 Time: 86, Input:N

014 s:2 9,(T),(O),(X),S,3 7->S No Input,t: n/a,r: n/a,d: 1003ms,tD: 994ms [1,1,1,0,1,0,1,0] (62%)

015 s:2 1,(9),6,7,(4),(8) E->8 Correct Last,t: 41ms,r: 0.04,d: 42ms,tD: 994ms [1,1,0,1,0,1,0,1] (62%)  
0 Time: 42, Input:4



- **LAYNE PERELLI, OWNER/CEO**
  - **TECHNOLOGY DEVELOPMENT**
  - **SCIENTIFIC RESEARCH**
  - **APP DESIGN**
- **SAM MAROPIS, PRESIDENT**
  - **BUSINESS MANAGER**
  - **MARKETING**
- **MIKE ROUTEN, CHIEF TECHNOLOGY OFFICER**
  - **SOFTWARE ENGINEER**
  - **SYSTEM ADMINISTRATOR**
  - **SERVER/DATA BASE DEVELOPMENT**
- **CHLOE LYKES, PUBLIC RELATIONS**
  - **WEB SITE DESIGN**
  - **SOCIAL MEDIA**

- WHAT'S NEXT
  - COMPLETE SOFTWARE DEVELOPMENT
    - DATA STORAGE & TRANSMISSION
      - CLOUD SERVER
      - DATA BASE
    - GRAPHS AND TABLES
    - REMOTE MONITORING APP
  - VALIDATION
    - LAB & FIELD RESEARCH
  - ESTABLISH POPULATION NORMS
  - REAL WORLD APPLICATION TRIALS
  - MARKETING



## HOW MUCH INVESTMENT FUNDING NEEDED:

COMPLETE SOFTWARE DEVELOPMENT

~\$45,000

PROTOTYPE TEST

~\$50,000

OPERATING EXPENSES

~ \$50,000/MONTH X 6 MONTHS =

~\$300,000

**~\$400,000**

**YOUR INVESTMENT: \$400,000**

**YOUR RETURN: 2-YEAR SUBSCRIPTION FOR 5,000 DRIVERS**

**FULL GMM SUPPORT**

**COMPLETE DATA STORAGE**

**MONITORED BY COMPANY SAFETY MANAGER**

**POTENTIAL INSURANCE REDUCTION**

**RECOGNITION AS WORLD LEADER ADVANCING SAFE DRIVING TECHNOLOGY**

**\$20/month per driver x 5,000 x 24 months**

**= \$2,400,000**