THE COMPLEX TRIAL PROTOCOL: A BRAINWAVE ANALYSIS TECHNIQUE TO DRAW OUT EVIDENCE FROM THE STORED MEMORY OF SUSPECTS AND WITNESSES OF CRIME

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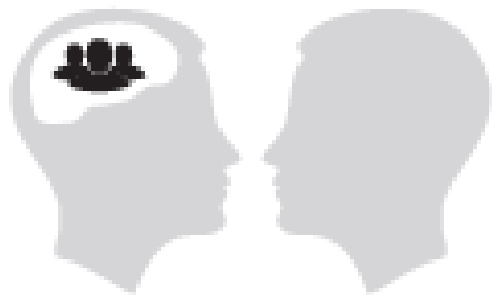
Canterbury Center for Policing Research (CCPR)

A PROBLEM IN UK (WORLDWIDE?) POLICING

75% of overturned wrongful convictions in the US cite eyewitness misidentifications as a factor

Eyewitness testimony has been scientifically proven to be generally inaccurate for many reasons including:

CROSS-RACIAL IDENTIFICATION DIFFICULTIES

MEMORY DEGRADATION

WEAPON FOCUS

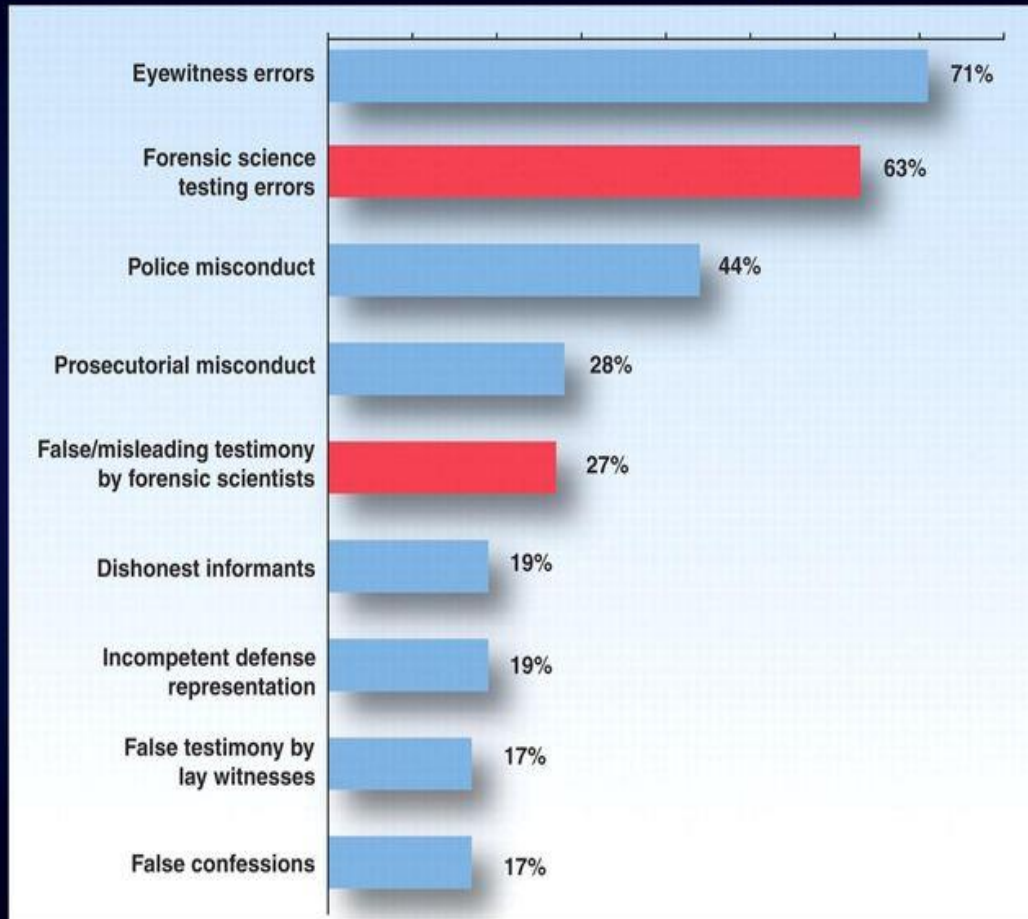Source: Innocence Network

(White & Case, 2012)

How Prevalent is the Problem?

Factors associated with wrongful convictions

Factor	Percentage
Eyewitness errors	71%
Forensic science testing errors	63%
Police misconduct	44%
Prosecutorial misconduct	28%
False/misleading testimony by forensic scientists	27%
Dishonest informants	19%
Incompetent defense representation	19%
False testimony by lay witnesses	17%
False confessions	17%

Saks & Koehler, *Science* (2005)

- 71% - Based on 300 cases overturned by post conviction DNA evidence (New England Innocence Project, n.d.)

- Estimate of 100 persons/year in the UK are wrongly convicted (Mojtahedi, 2016)

THE WALL OF INNOCENCE

THIS IS WHY I DO RESEARCH

WRONGFULLY CONVICTED BECAUSE OF EYEWITNESS MISIDENTIFICATION

1 YEAR IN PRISON FOR NOTHING – but sentenced to 9 years

William Mills
2021-2022

16 YEARS IN PRISON FOR NOTHING

Andrew Malkinson
2004-2020

23 YEARS IN PRISON FOR NOTHING

Miguel Solorio
2000-2023

7.5 YEARS IN PRISON FOR NOTHING

Leonard Mack
1976-1984

26 YEARS IN PRISON FOR NOTHING

Tyrone Day
1997-2023

34 YEARS IN PRISON FOR NOTHING

Sydney Holmes
1989-2023

32 YEARS IN PRISON FOR NOTHING

Thomas Raynard James
1990-2022

42 YEARS IN PRISON FOR NOTHING

Kevin Strickland
1979-2021

7 YEARS IN PRISON FOR NOTHING

Barry George
2000-2007

Nearly 200 years!!

5

EEG-Based Complex Trial Protocol (CTP) : A Potential Solution

Lie Detection?

Brain Fingerprinting?

OR

LOCARD EXCHANGE PRINCIPLE

EVERY CONTACT LEAVES A TRACE!

EDMOND LOCARD
(1877-1966)

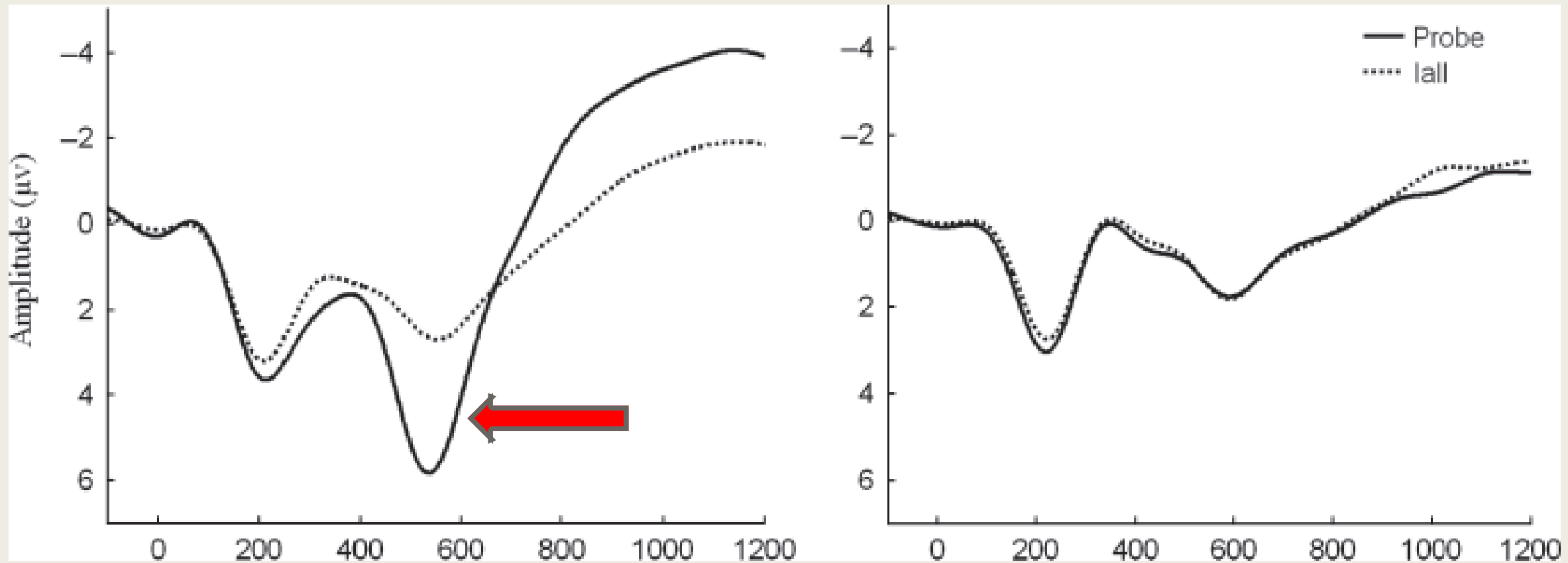# Complex Trial Protocol
The Independent Lab Validation

Electrophysiology 101
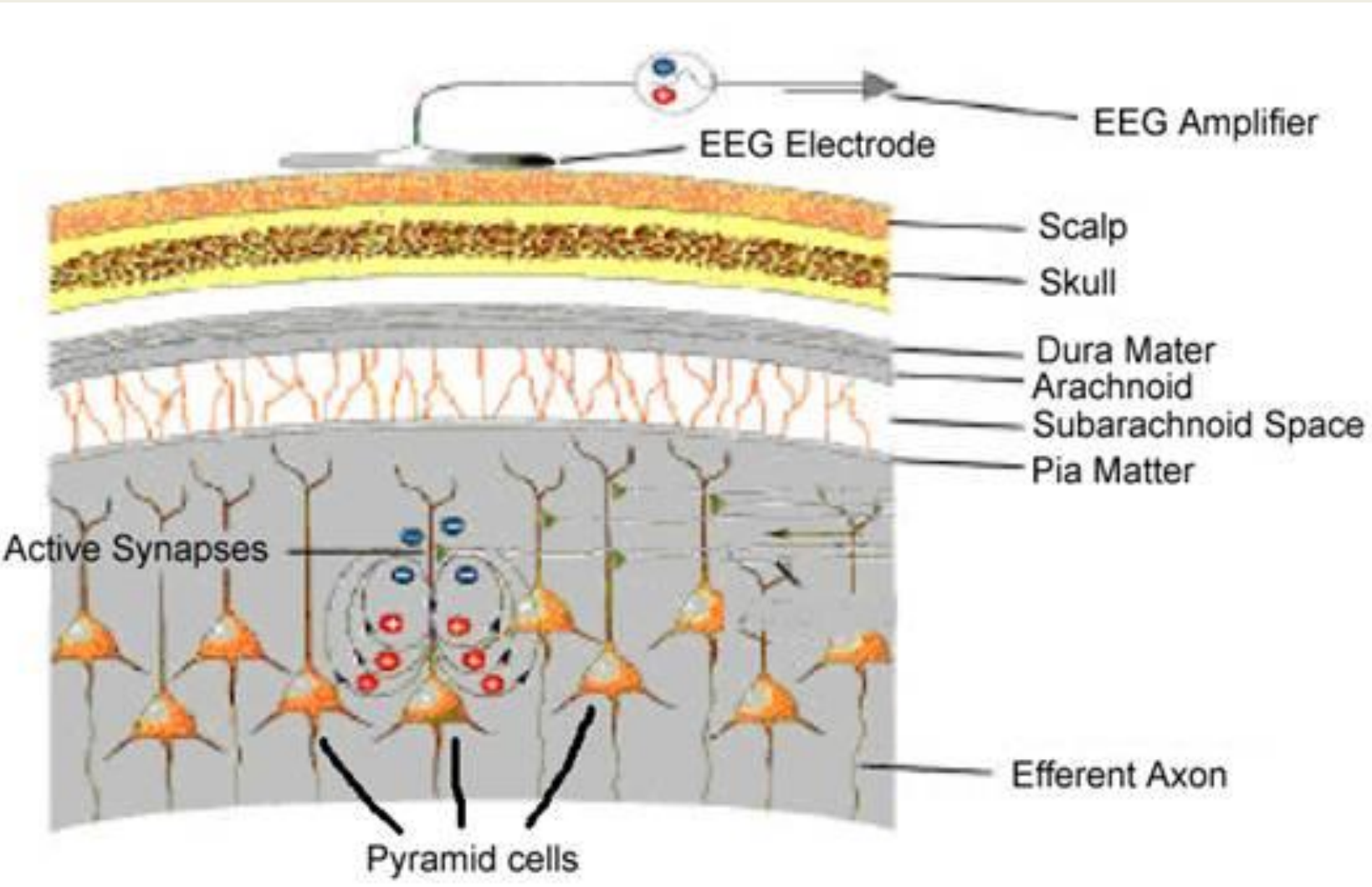
P300

Information Present in Knowledgeable Group

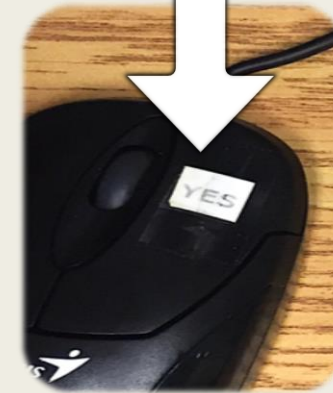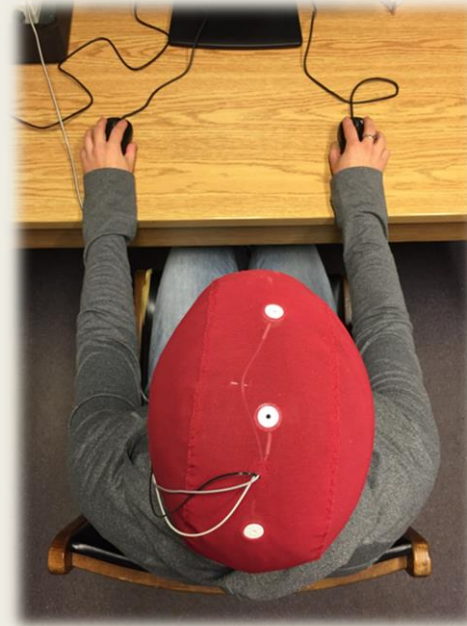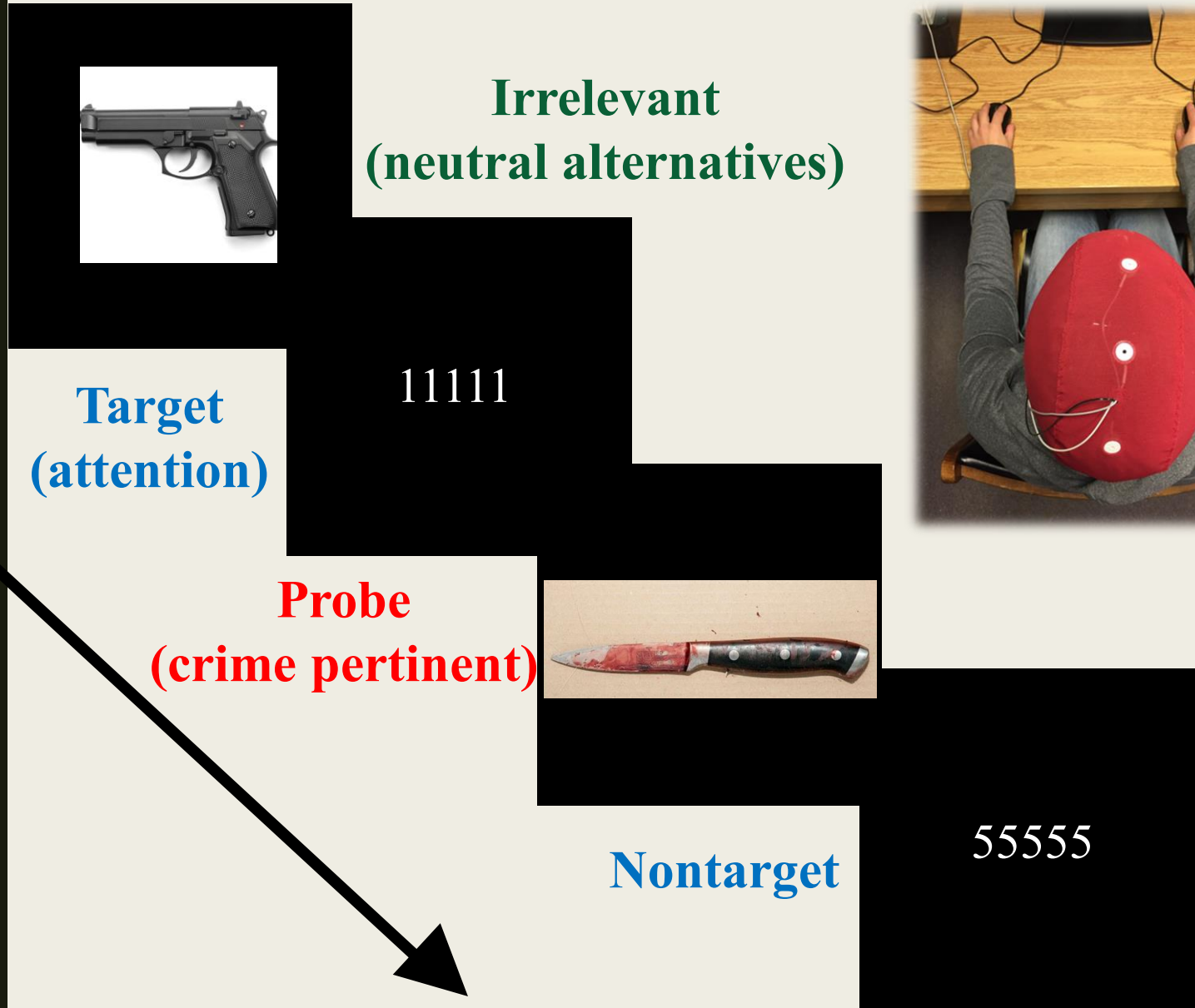Information Absent in Non-Knowledgeable Group

(Meixner & Rosenfeld, 2011)

Stimuli – Murder Weapon

Probe

Complex Trial Protocol

Irrelevant (neutral alternatives)

Target (attention)

11111

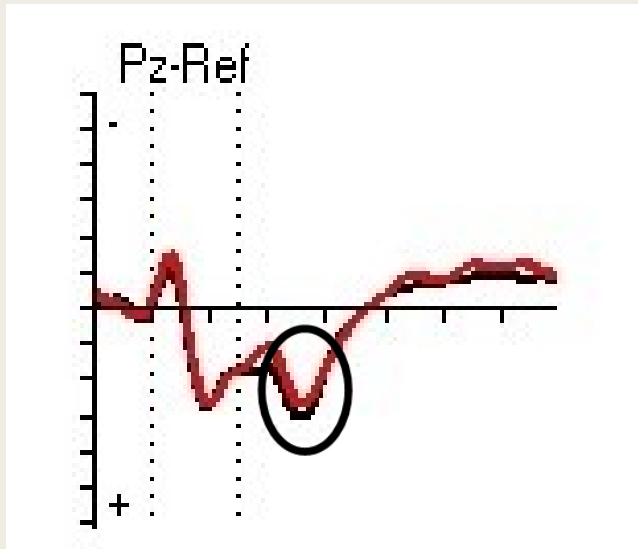**Probe (crime pertinent)**

Nontarget

55555

Left mouse

Right mouse

EEG - CTP

- 7 electrodes
- Ground
- EOG x 1
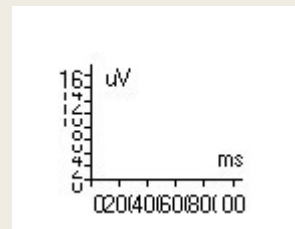- Mastoids x 2
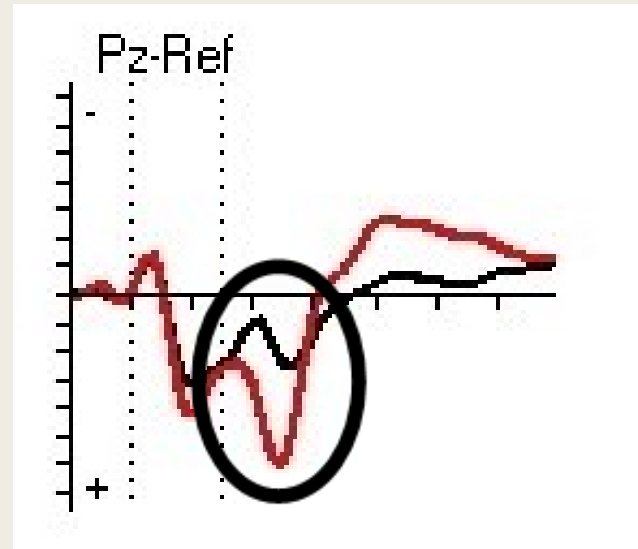- Fz, Cz, Pz
- 5 software

Autobiographical Data – CTP Independent Validation
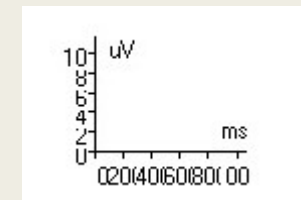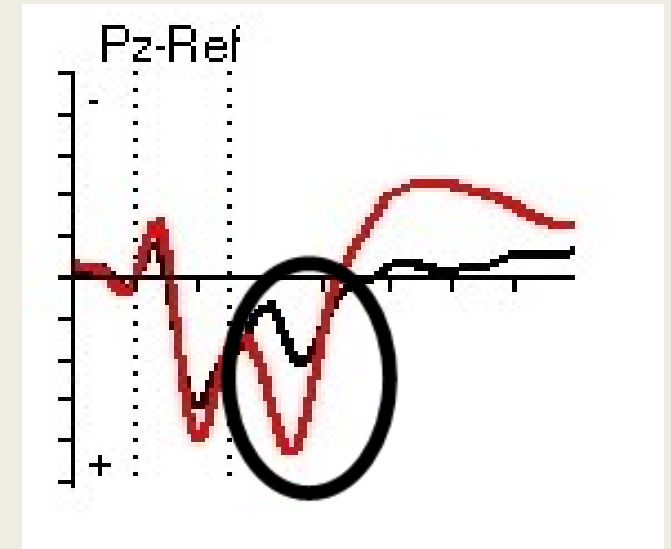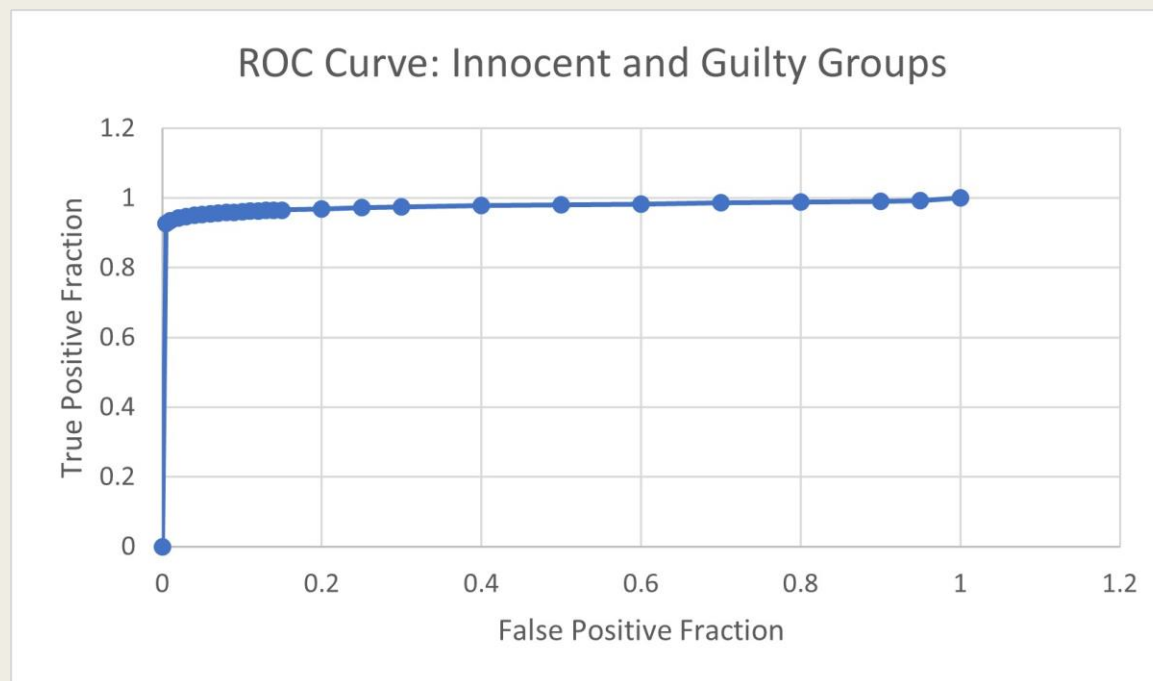
Innocent Control Group
at Pz
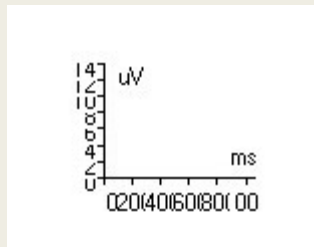
Simply Guilty Group
at Pz

Guilty Countermeasure Group
at Pz

Positive plotted downward

Probe ▬
Irrelevant ▬

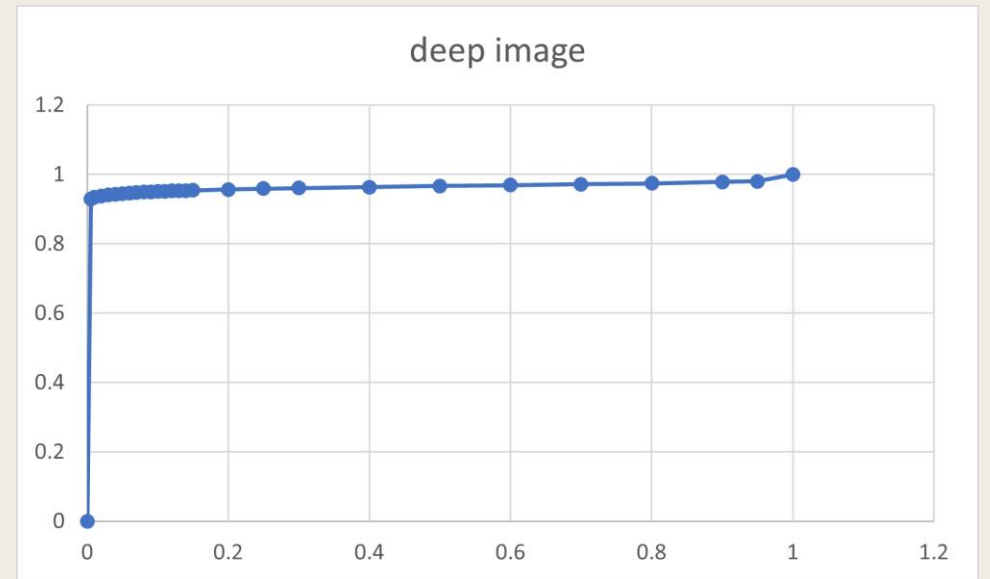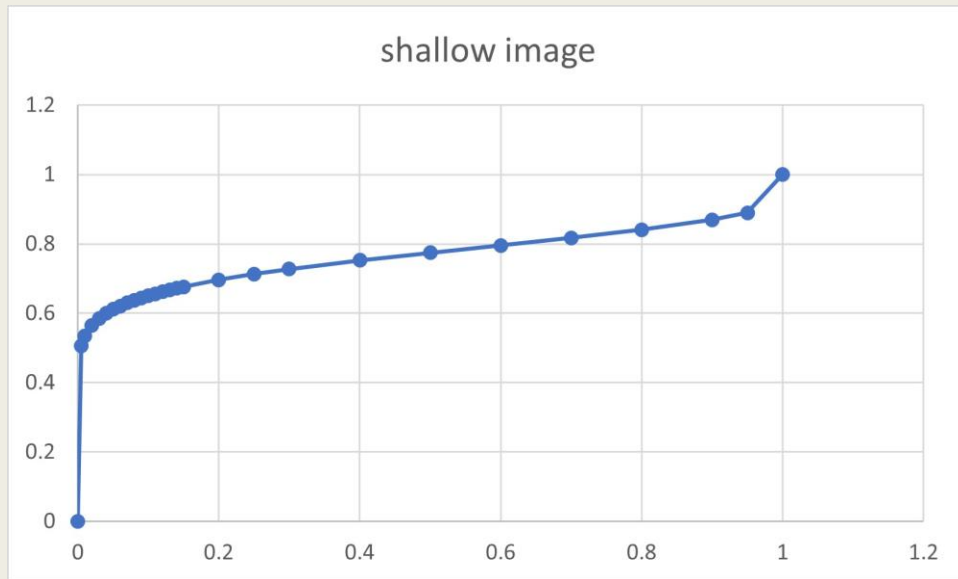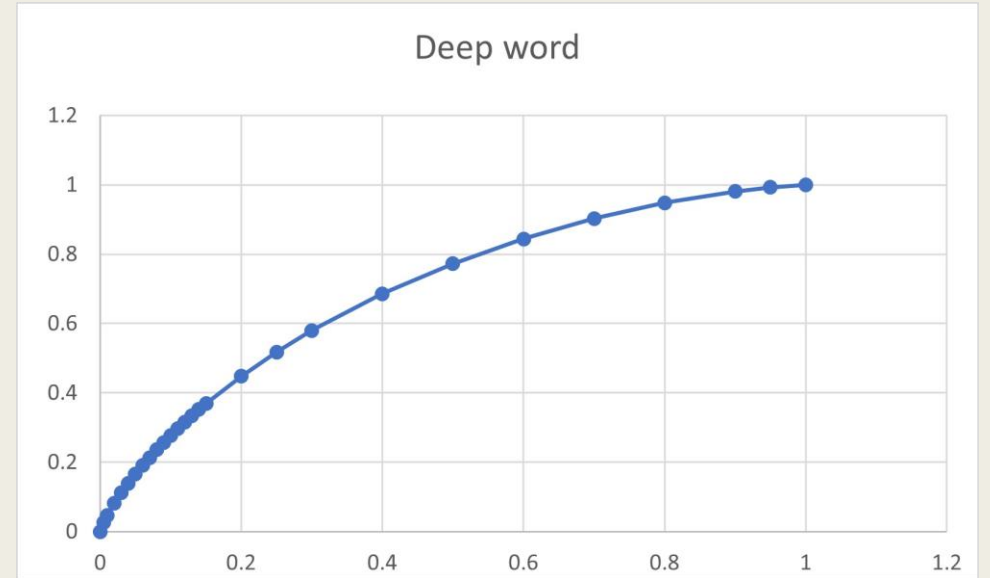(Funicelli, et al., 2021)

Individual Classification Rates by Group

	IC	SG	GCM
Correct	(14/14) 100%	(15/16) 94%	(14/15) 93%
Incorrect	(0/14) 0%	(1/16) 6%	(1/15) 7%

ROC Curve: Innocent and Guilty Groups

(Funicelli, et al., 2021)

Levels of Processing – Words & Images – Mock Theft

(Funicelli, et al., 2023)
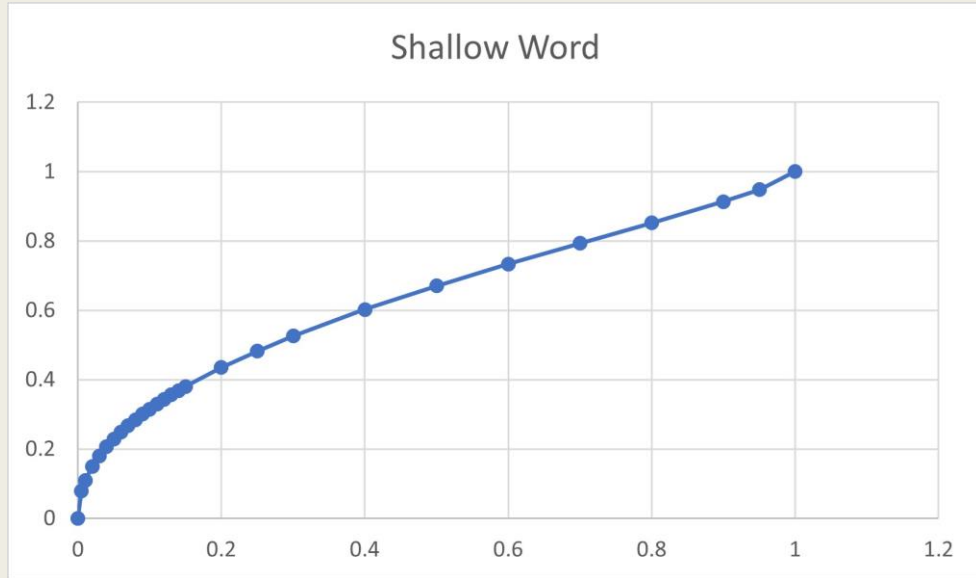
Mock Terrorism Experience
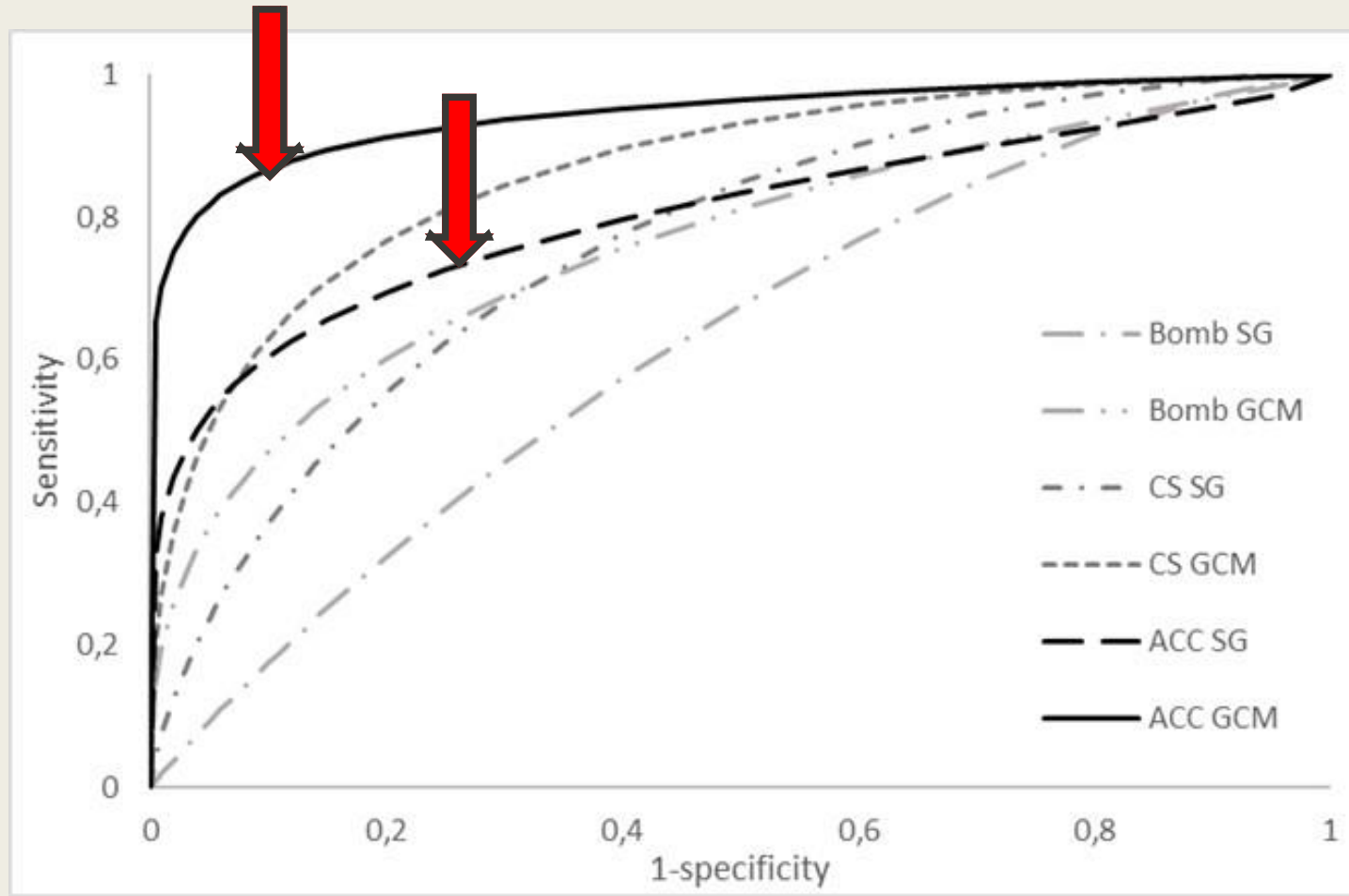
- Face of Accomplice (hit rates 77% - SG to 93% GCM; AUC 81-94%)

- Crime Scene (hit rates 69% - SG to 93% GCM; AUC 74-87%)

- Explosive device (hit rates 54% - SG to 71% GCM; AUC 63-76%)

(Funicelli, et al., in preparation)

Complex Trial Protocol Field Application

Concealed Information Test

- Probe

Crime relevant detail only known to author & authorities

- Examples of probe stimuli

Wound pattern
Face of suspect / victim
Murder weapon
Crime scene

- Irrelevants

Neutral & plausible alternatives

Stimuli - Facial

Irrelevants

Probe

- Police generally find physical evidence in 5-20% of criminal offences and crime scenes (except in cases of homicides and sexual assaults) (Baldwin & McConville, 1980, Horvath & Meesing, 1996, and Peterson et al, 2010)

- Memory is untapped source of probative evidence

- CTP can produce reliable & objective quantitative measure of memory recognition index (as opposed to subjective statements: *I am pretty sure it's him"*)

- Non-Choosers, Recanters & Cold Cases – CTP can produce a historical record of memory recognition index.

Research Team – Concordia University
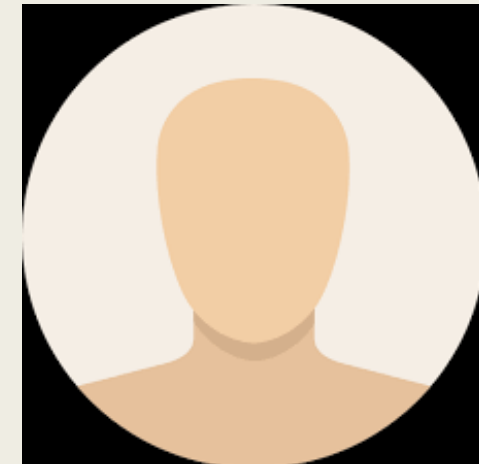

Simon Houle

Sarah Salphati

Lauren White

Yasmine Doré

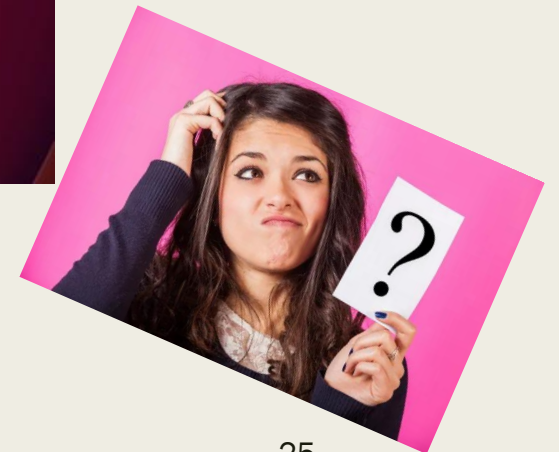Prof. Jean-Roch Laurence

Sabina Ungureanu

You Tube Interview
Podcast: Murder Was the Case

- [Interview with Dr. Michel Funicelli & Prof Robin Palmer]

Thank you

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