

~~BIAS~~

WHY MUST FORENSIC PRACTICE BE  
BASED ON **COGNITIVE** RESEARCH?

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&

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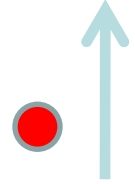
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But, first let's clear up some commonly held  
**misconceptions** about bias:

- Bias = Error
- Bias is intentional
- 
-

Misconception: Bias = Error

**Case 1: bias is in the direction of the 'evidence':**



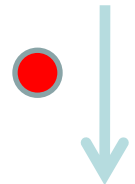
Threshold to decide a match

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Undecided

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Threshold to decide an exclusion



Misconception: Bias = Error

**Case 2: bias is in the opposite direction of the 'evidence':**



Threshold to decide a match

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Undecided

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Threshold to decide an exclusion



Misconception: Bias = Error

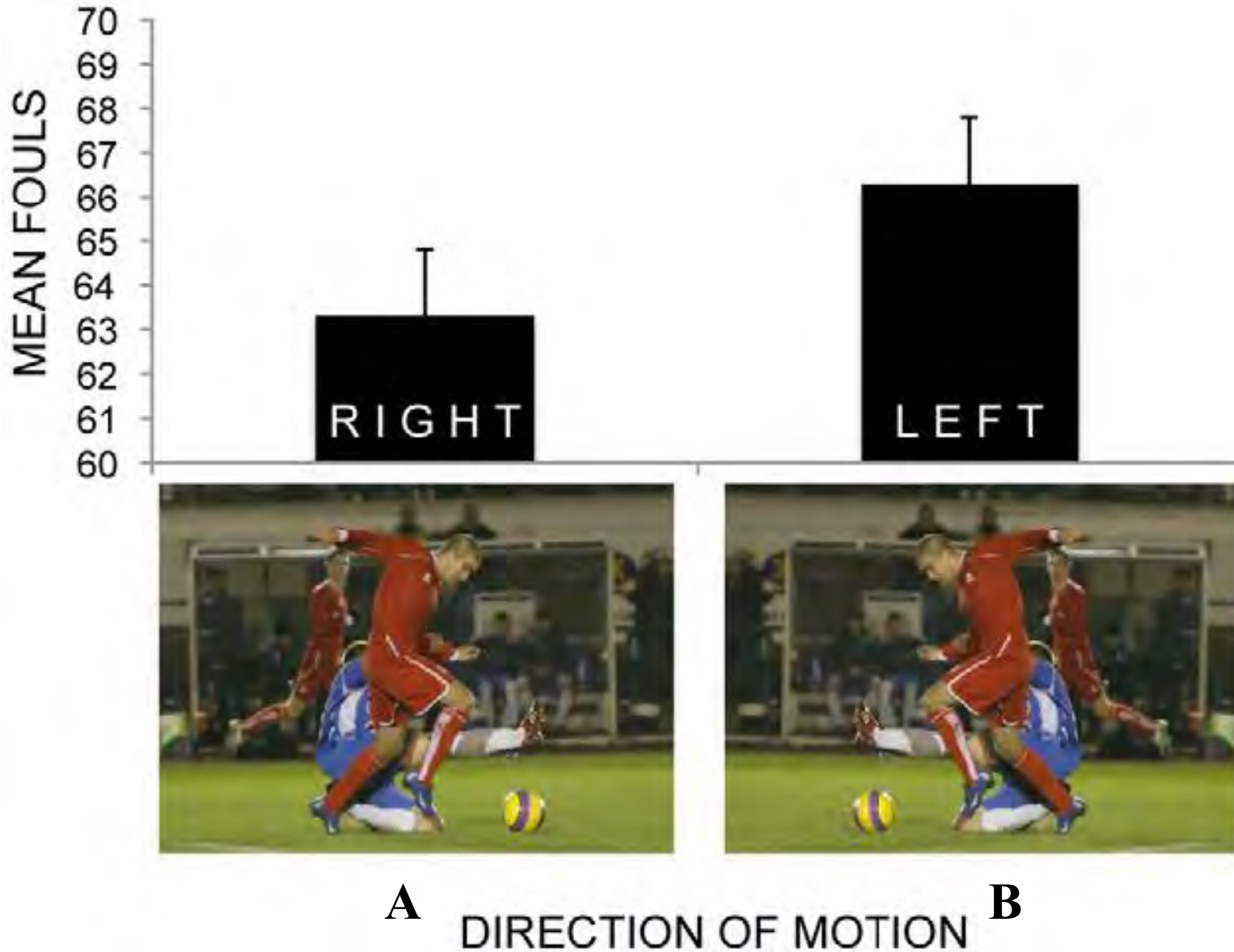
**Bias affects the answer when it can move the actual evidence across the threshold!**

**And this is a function of :**

- 1. How near the evidence is to the threshold**
- 2. The direction and magnitude of the bias**

**But..., does bias affect the process? YES**

# Misconception: Bias is intentional



Misconception: Bias is intentional

Because it is not intentional,  
and it is without awareness:

- Not an ethical issue
- Awareness by itself does not solve the problem

The big picture:

Improve  
forensic  
science

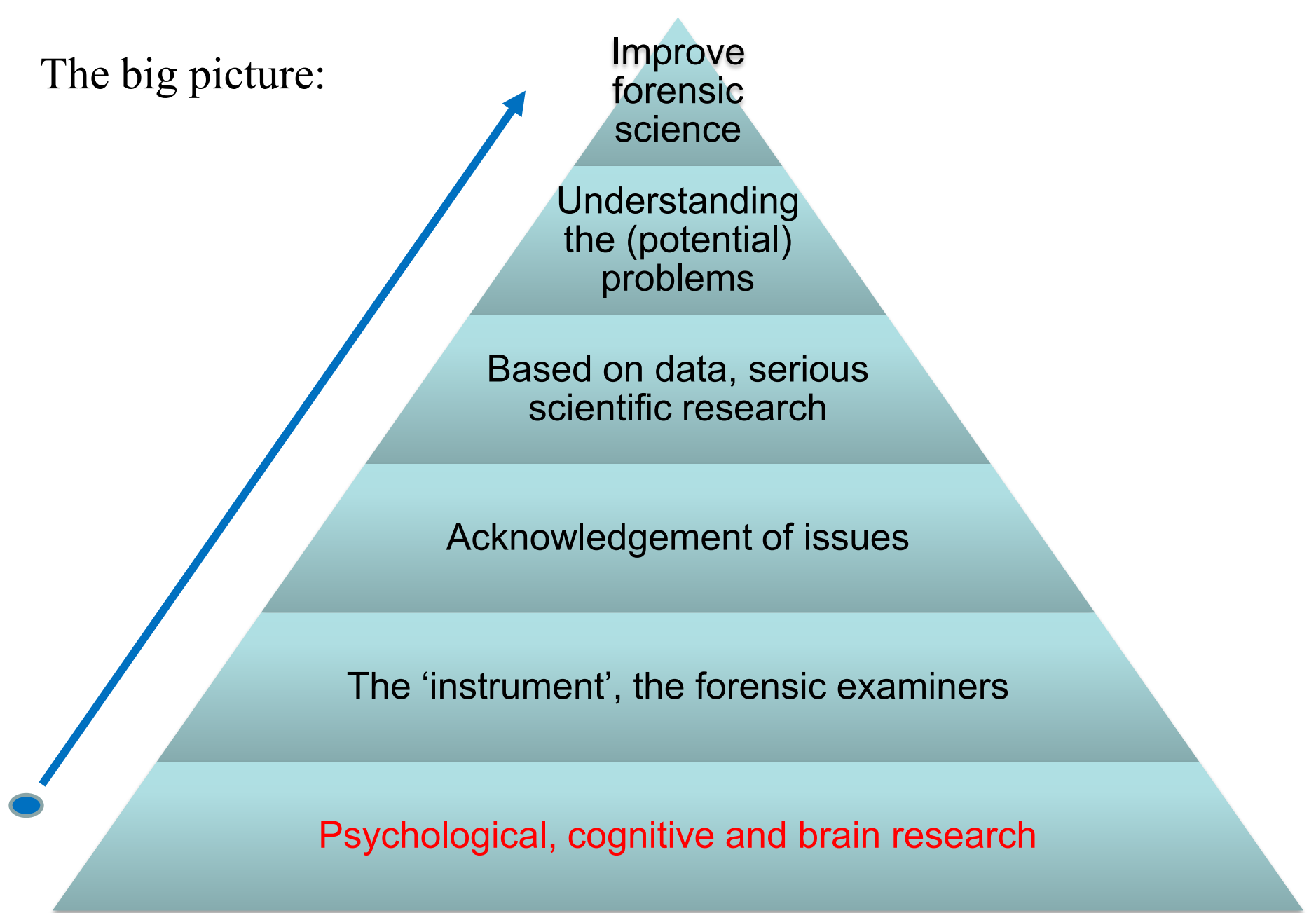
Understanding  
the (potential)  
problems

Based on data, serious  
scientific research

Acknowledgement of issues

The 'instrument', the forensic examiners

Psychological, cognitive and brain research







## So, what do we need to know?

- We are a machine with **limited resources**
- Therefore we are an **active** machine rather than passive
- **“The mind is not a camera”** (from ‘*Perception is Far From Perfection*’, Dror, 2005, Journal of Brain & Behavioral Sciences)
  - This --in a nutshell-- is our intelligence and expertise!
  - **But can also cause problems...**

## Cognitive Trade-offs

From „Paradoxical functional degradation in human expertise: The price of cognitive trade-offs involved in expertise and knowledge’ (Dror, in press),  
The Paradoxical Brain. Cambridge University Press:

“Expertise is correctly, but one-sidedly, associated with special abilities and enhanced performance. The other side of expertise, however, is hidden. Along with expertise, performance may also be degraded, culminating in a lack of flexibility and error. Expertise is demystified by explaining the brain functions and cognitive architecture involved in being an expert. These information processing mechanisms, the very making of expertise, entail computational trade-offs that sometimes result in paradoxical functional degradation. For example, being an expert entails using schemas, selective attention, chunking information, automaticity, and more reliance on top-down information, all of which allows experts to perform quickly and efficiently; however, these very mechanisms restrict flexibility and control, may cause to miss and ignore important information, introduce tunnel vision and bias, and can cause other effects that degrade performance. Such phenomena are apparent in a wide range of expert domains, from medical surgeons and forensic examiners, to military fighter pilots and financial traders.”

## Let's see some specific mechanisms

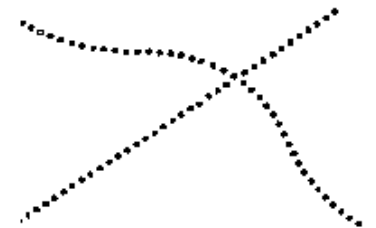
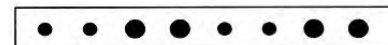
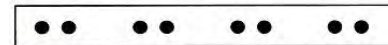
- How wonderful they are....
- And then the problems they can cause
- We will build up, starting with initial encoding and perception, moving to information processing and cognition, and finally the human mind itself.
  1. Perceptual
  2. Cognitive
  3. Mind

# Chunking

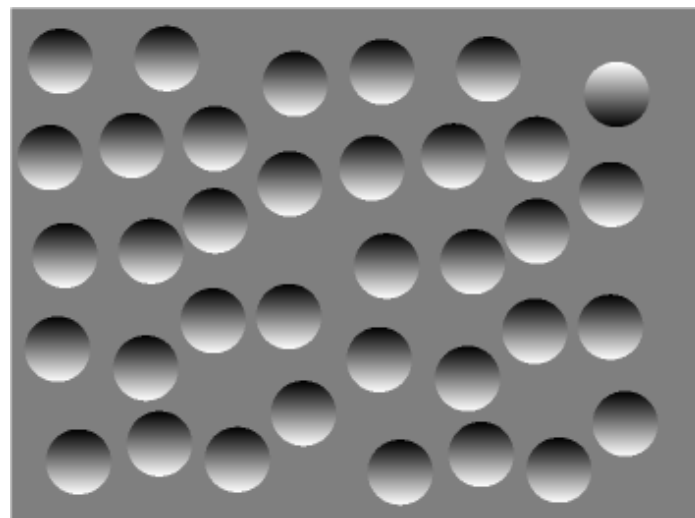
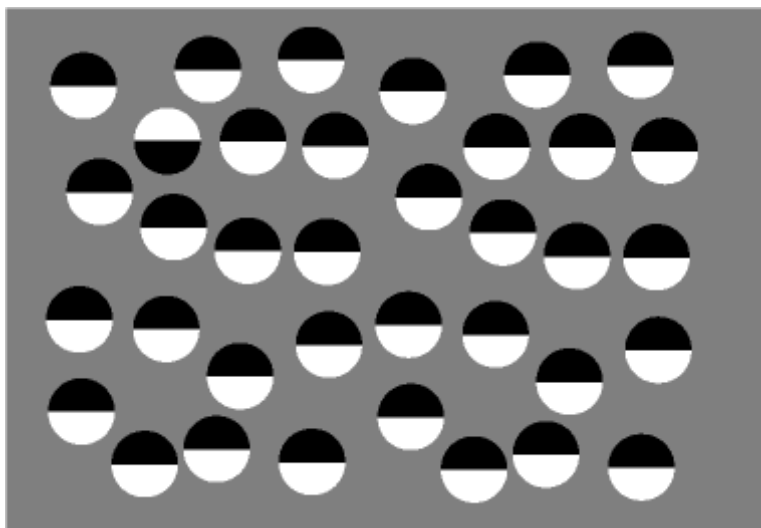
To minimise load, rather than attending to a subset of the information, information can be chunked/compressed.

Examples:

- \* Phone numbers
- \* Motor commands
- \* Visual grouping



Can you find the odd one out?



**Active and dynamic** information processing, 3-D interpretation of the information.

# Chunking

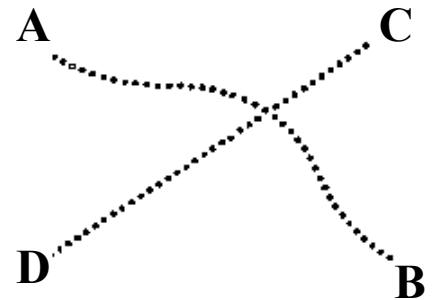
To minimise load, rather than attending to a subset of the information, information can be chunked/compressed.

→ Impose structure and organization that reflects **us**, not the 'world':

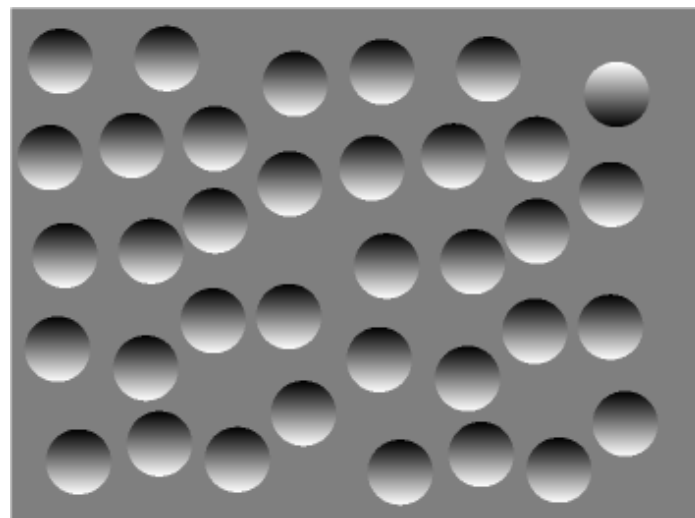
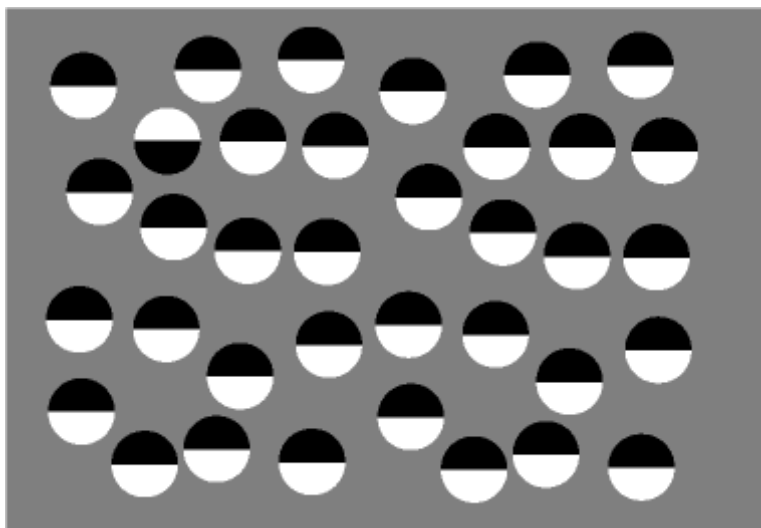
- *Chunk in certain ways, and not others*
- *Lose accessibility and control*
- *See things differently, don't see things*

Examples:

- \* Phone numbers
- \* Motor commands
- \* Visual grouping



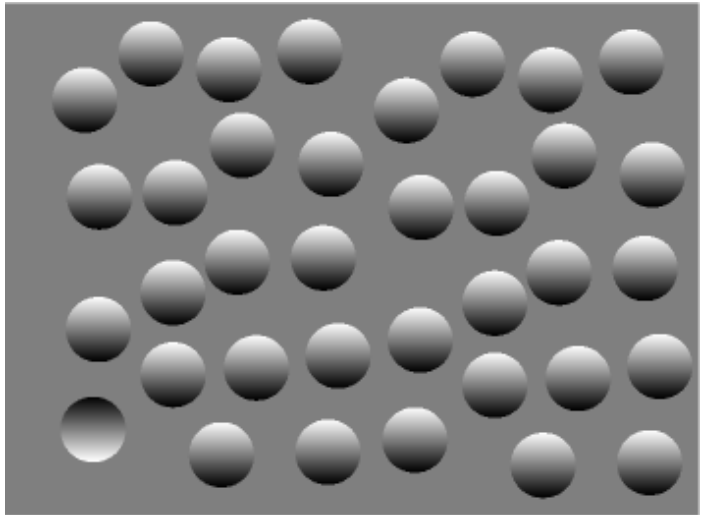
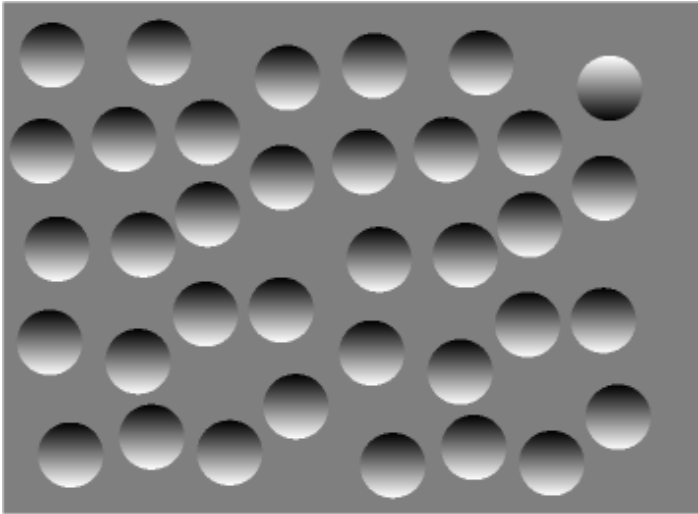
Can you find the odd one out?



**Active and dynamic** information processing, 3-D interpretation of the information.

*Make active assumptions....which determine how we interpret the information....*

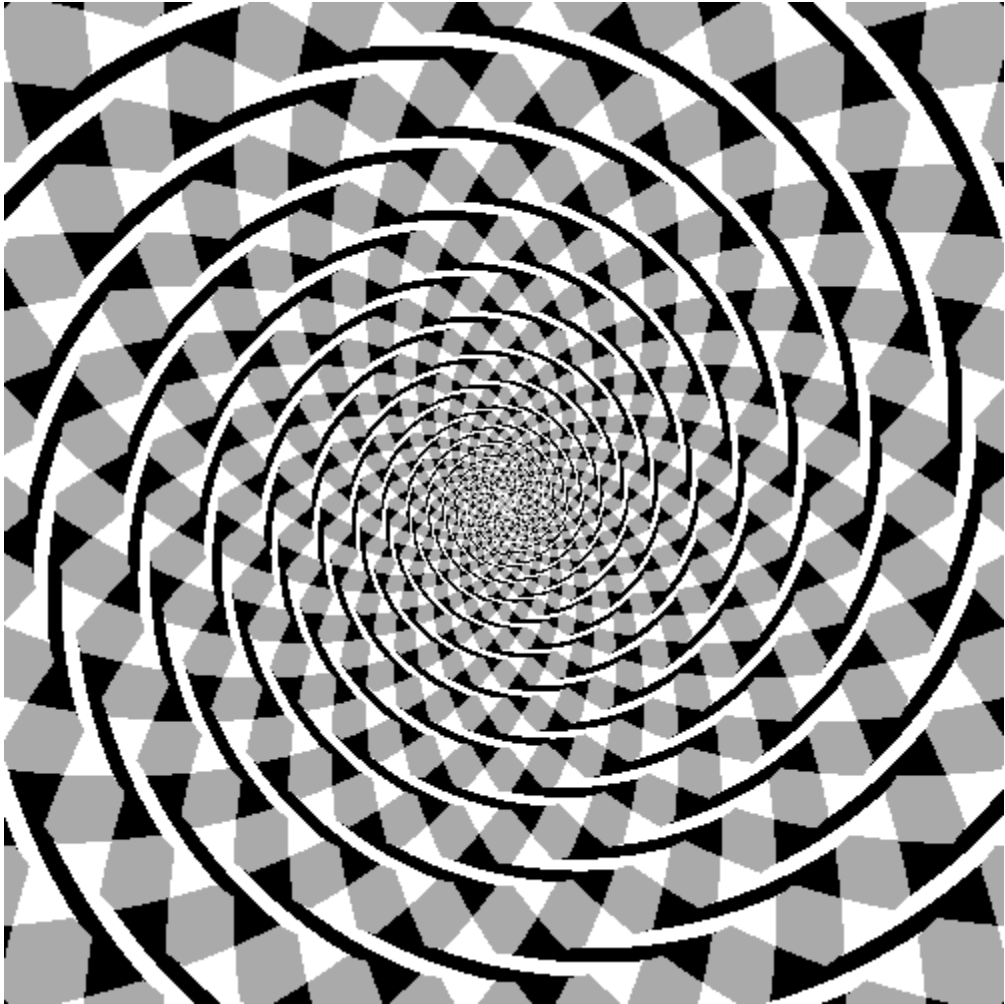


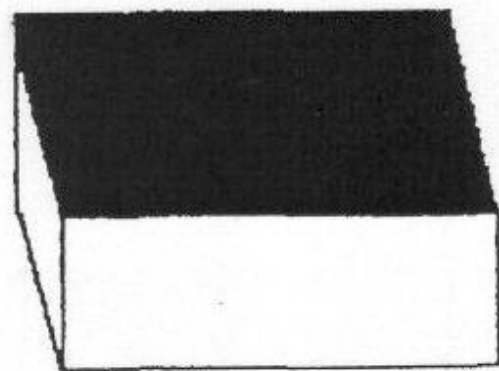


So, we:

1. Impose structure by chunking
2. Make assumptions by being active

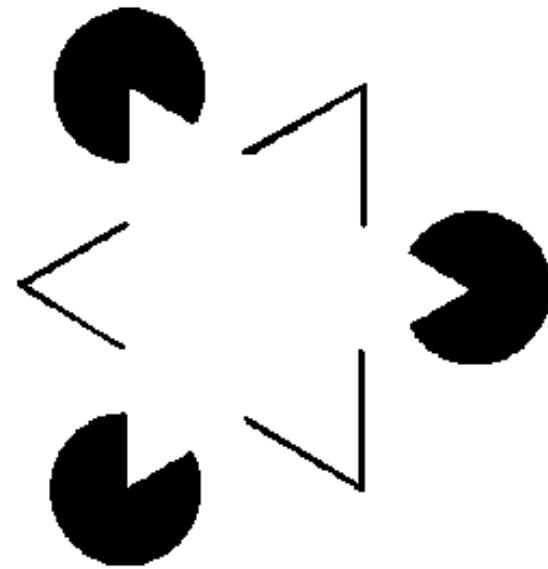
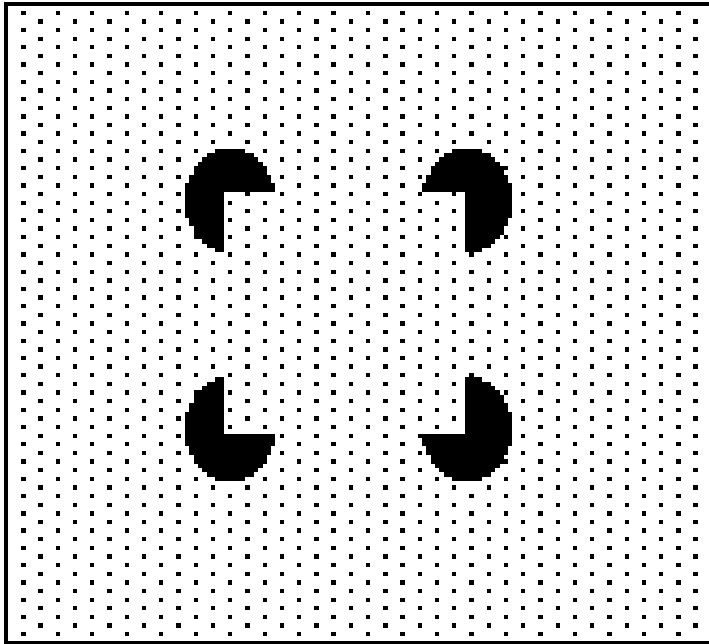
But we also distort the information!







And not only distortions, but also see things that are not there....



And not only see things that are not there.... but not seeing what is there....

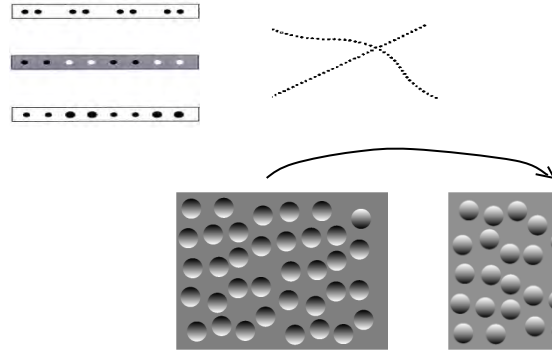






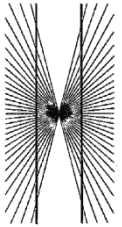
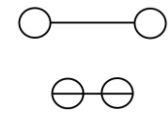
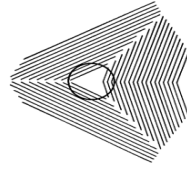
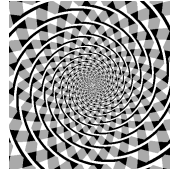
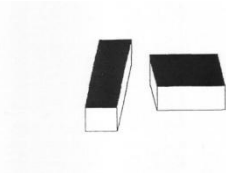
# So, we have seen:

- Imposing order

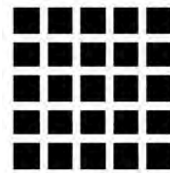
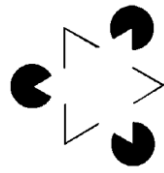
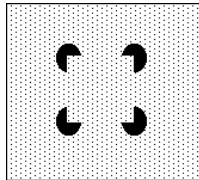


- Making assumptions

- Distort



- Add



- Not see

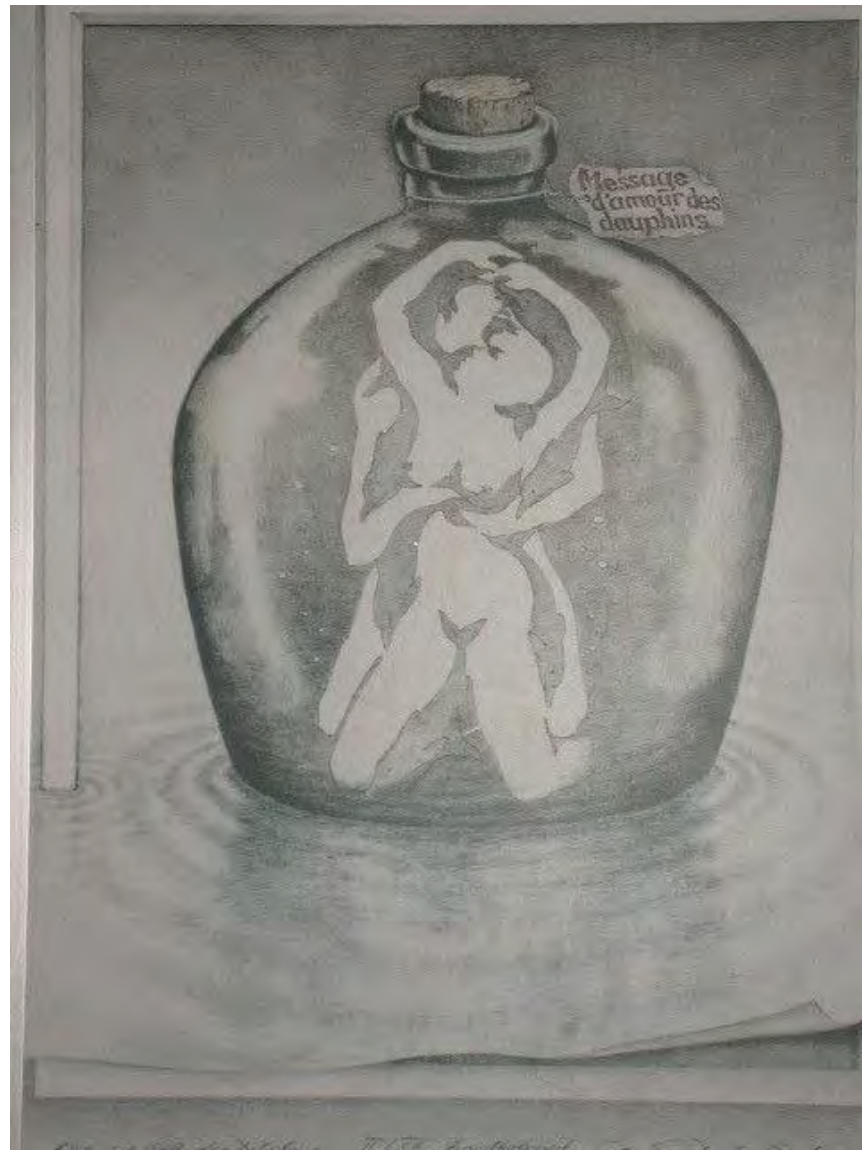


*(and there is more....)*

## Let's see some specific mechanisms

- How wonderful they are....
- And then the problems they can cause
- We will build up, starting with initial encoding and perception, moving to information processing and cognition, and finally the human mind itself.
  1. Perceptual → What happens with expertise?
  2. Cognitive      Hear tomorrow, from Rebecca
  3. Mind            Bucht, about the **Cognitive Profiles Project**

# THE POWER OF COGNITIVE KNOWLEDGE



A B C

D B A

After reading the  
the sentence, you are  
now aware that the  
the human brain  
often does not  
inform you that the  
the word 'the' has  
been repeated twice  
every time.

Count how many 'F's are in the following text

FINISHED FILES ARE THE RE  
SULT OF YEARS OF SCIENTI  
FIC STUDY COMBINED WITH  
THE EXPERIENCE OF YEARS...

# So, we have seen:

FINISHED FILES ARE THE RESULT OF YEARS OF SCIENTIFIC STUDY COMBINED WITH THE EXPERIENCE OF YEARS...



12  
ABC  
14

THE CAT



THE PWEOR OF COGITVIE KONLWDEGE

***And... there is more!!!***



- Context
- Knowledge
- Emotional
- Framing
- Social
- State of mind
- Frame of mind
- Motivation
- Expectation
- Hope
- 
-

## The mind 'plays tricks', a few examples:

- Self-fulfilling prophecies
- Wishful thinking
- Confirmation bias
- Contextual enhancements
- Conformity
- Cognitive dissonance
- Escalation of commitment
-

Remember this?



→ The same piece of information can get different interpretations, depending on context

→ Not only perceptual context, but also mental context, e.g., motivation. Balcetis, E. & Dunning, D. (in press). See what you want to see:

Motivational influences on visual perception.

*Journal of Personality and Social Psychology.*

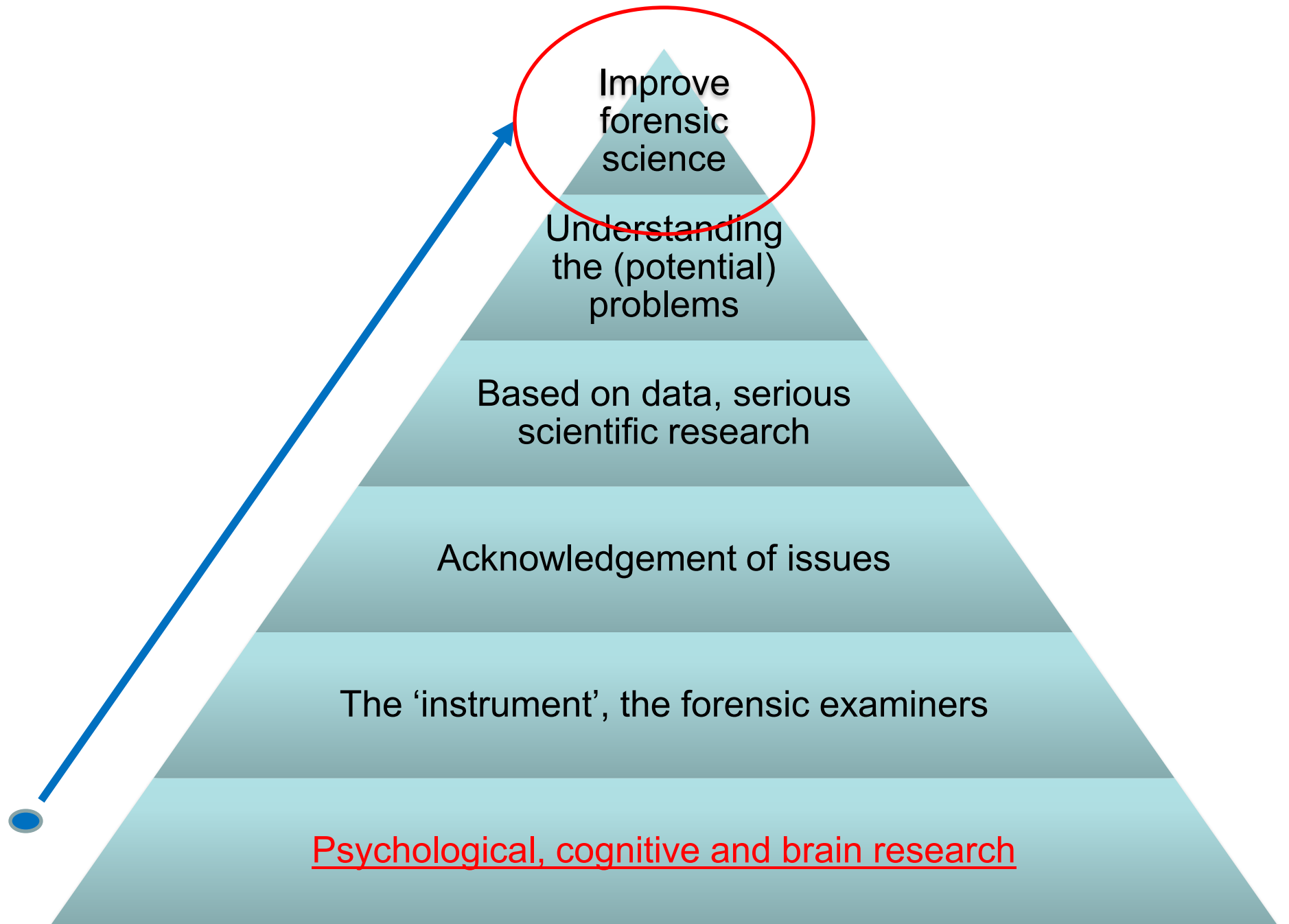
Say the colour of the ink, not the word:

YELLOW	BLUE	ORANGE
BLACK	RED	GREEN
PURPLE	YELLOW	RED
ORANGE	GREEN	BLACK
BLUE	RED	PURPLE
GREEN	BLUE	ORANGE

- No 'control'
- No 'off/on' button
- Awareness, by itself, cannot solve the issue

→ Must take active steps

- E.g.,
- Training on bias and cognitive issues
  - Best practices
  - Better selection and screening during recruitment



# Not „theoretical’ or „academic’ → Real Case Work!



The image of the car, taken from camera #6 at 00:17.20.

This is the only frame that includes the registration plate of the car.

# Not „theoretical’ or „academic’ → Real Case Work!



The car's registration plate, enlarged from the image.



REQUEST FOR EXAMINATION  
OF PHYSICAL EVIDENCE  
SP-997-C (Rev. 10/83)

Department of Public Safety  
Division of State Police  
Forensic Laboratory

FOR LABORATORY USE ONLY

Lab # ED94K10971

Receipt # 4303E

1093I1540

SUBMITTING AGENCY: _____	TYPE OF CRIME/INCIDENT: <u>Homicide</u>
ADDRESS: _____	LOCATION: _____
TELEPHONE NUMBER: _____	DATE: _____
CASE NUMBER: <u>93 43156</u>	
CASE PREVIOUSLY SUBMITTED? [ ] YES [x] NO	EVIDENCE EXAMINED BY ANY OTHER AGENCY?
IF YES, LAB ID#: _____	[ ] YES [x] NO

VICTIM(S) NAME	D.O.B.	RACE	SEX	SUSPECT(S) NAME	D.O.B.	RACE	SEX
_____	12/21/59	W	M	_____	2/25/75	B	M

SUMMARY OF CASE: A while procuring drugs in the city this victim was shot in his vehicle, which the suspect reportedly drove prior to the shooting. The victims prints and his wife's were eliminated. Also a friend who had been in the vehicle.

LIST ITEMS SUBMITTED BELOW (NOTE: Each item must bear an evidence tag or label.)

ITEM #	NAME AND DESCRIPTION OF ITEM TO BE EXAMINED	EXAMINATION REQUESTED
5	Prints to be compared to cards supplied of the suspect To be enhanced if possible.	Comparison of suspect's

(IF THIS SPACE IS INSUFFICIENT, CONTINUE LIST ON THE REVERSE SIDE OF THIS FORM.....)

REMARKS:  
  
The above listed suspect is the person who pulled the trigger, making every effort to place him in the truck. One witness riding in the truck was too drunk to make an identification.

NAME OF PERSON REQUESTING EXAMINATION: Det \_\_\_\_\_ DATE: \_\_\_\_\_

DPS STATE POLICE SERVICES  
 2008 FEB 18  
 EVIDENCE RECEIVING

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- How wonderful they are....
- And then the problems they can cause
- We will build up, starting with initial encoding and perception, moving to information processing and cognition, and finally the human mind itself.
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**To summarise:**

# The Human Mind is not a camera

- We process things actively; rather than being passive, we ‘organize’, make assumptions, and ‘impose’ order on the world around us, and actively interpret it.
- These reflect our cognitive mechanisms rather than the actual information we are processing.
- It is naïve, and incorrect, to assume (let alone take for granted), that we perceive things the ‘way they are’.

- Furthermore, our past experience, expectations, and a whole range of factors affect how we perceive, what we see (or do not see), and how we interpret it.
- These, of course, reflect our subjectivity

## These can cause:

- Filling-in information in certain ways
- Interpretations of information in certain ways
- Ignoring certain information
- Seeing information that is not there
- 
-

# Attention

- We only process a small part of the information.
- We selectively attend to some information.
- And... ignore the rest.

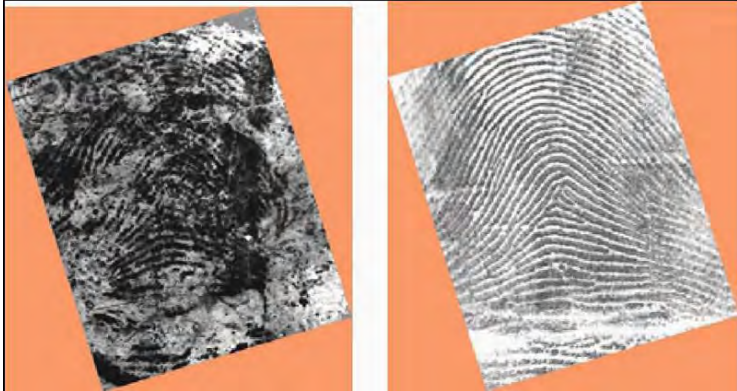
## Top-down processing

We process information not only based on the 'data' itself (bottom-up) but also based on top-down processing.

Top-down is a wide range of processes, all of which are based on what we already know.

Context, expectations, tacit knowledge, and much more, all of which makes us active and dynamic information processors (rather than passively receiving input).

# Do they match?

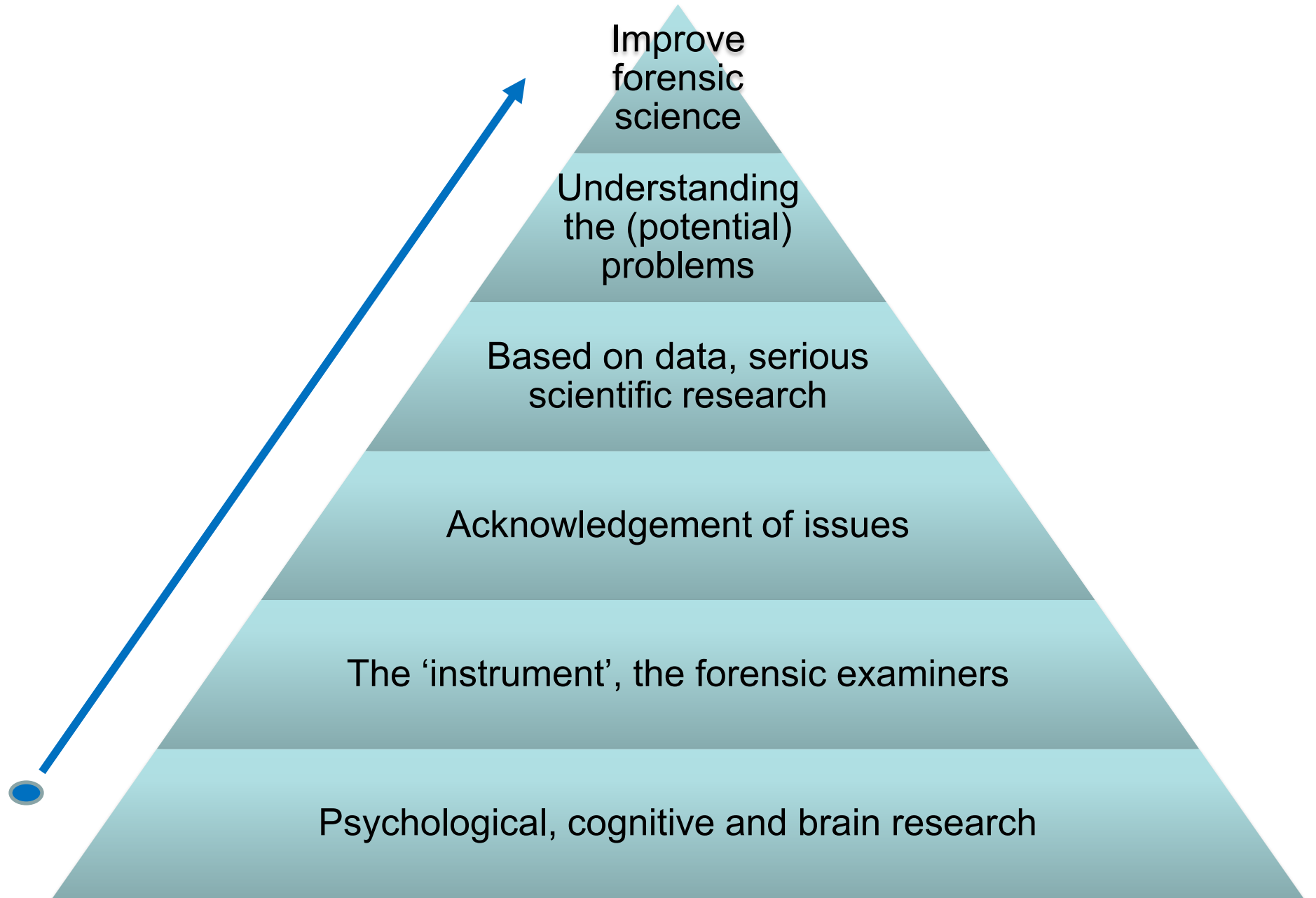


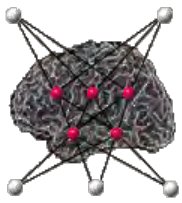
*Other forensic domains too!*

<u>Context 1</u>	<u>Context 2</u>
He confessed to the crime	Someone else confessed to it
An eye witness identified him	Someone else was identified
The detective 'knows' he is guilty	The detective thinks it is not him
	



# What is this all about?





**Thank you!**

**C**ognitive  
Consultants  
International Ltd

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