ISHI INTERNATIONAL SYMPOSIUM ON HUMAN IDENTIFICATION
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mindgen

BALANCING EFFORT &EASE

A FORENSIC SCIENTIST PERSPECTIVE ON INTEGRATING BIAS REDUCING STEPS IN FORENSIC DNA TESTING

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BIAS

Forensic techniques are subject to human bias, lack standards, panel found

The Washington Post

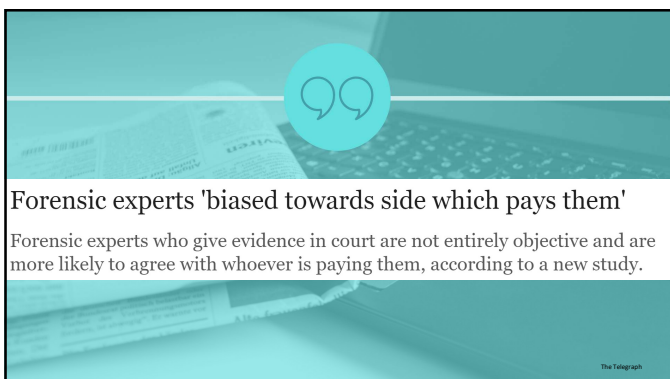# DNA analysis: far from an open-and-shut case

Forensic evidence is widely considered to be the result of purely objective lab tests, but there's growing proof that psychological bias plays a part

The Guardian

The survey also raises fresh questions about issues of bias in forensic science, with nearly a third of respondents admitting they sometimes feel pressured to produce a particular result, while three-quarters say they sometimes have insufficient time to evaluate cases.
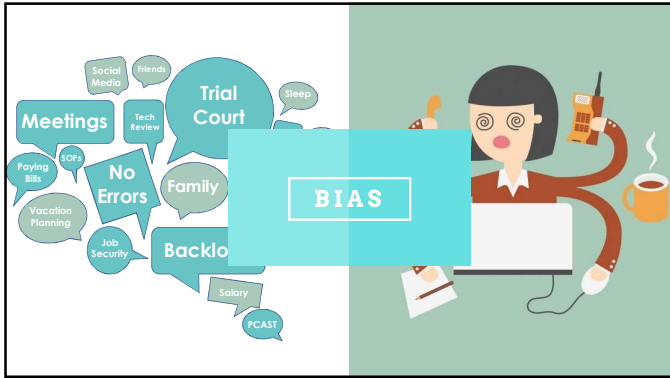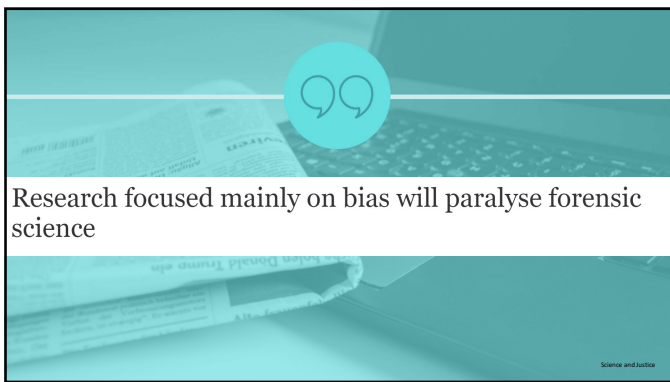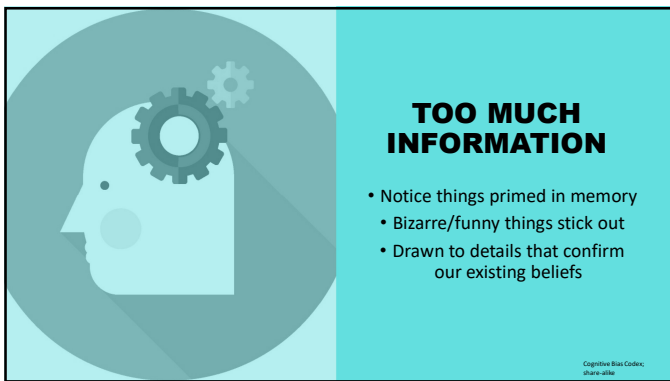
New Scientist

Forensic experts 'biased towards side which pays them'
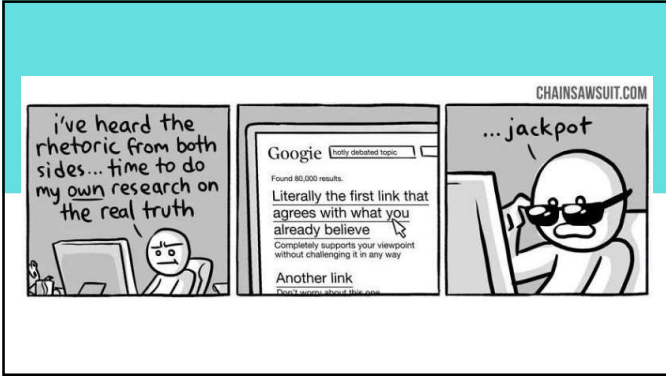
Forensic experts who give evidence in court are not entirely objective and are more likely to agree with whoever is paying them, according to a new study.

The Telegraph

Research focused mainly on bias will paralyse forensic science

TOO MUCH INFORMATION

- Notice things primed in memory
- Bizarre/funny things stick out
- Drawn to details that confirm our existing beliefs

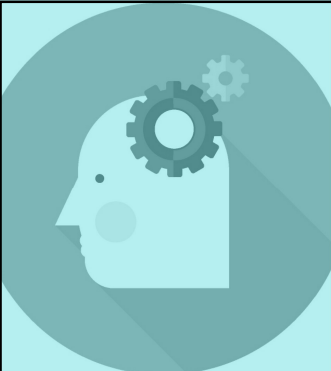**NOT ENOUGH MEANING**

- Find patterns even when looking at sparse data
- Fill in information from prior history
- Project our current mindset and assumptions onto the past and future

Cognitive Bias Codex; share-alike
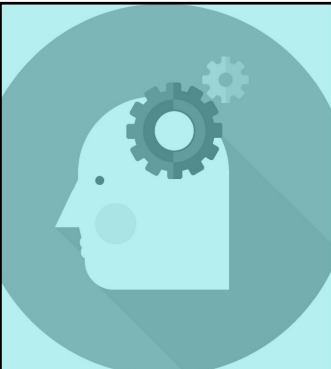
NEED TO ACT FAST

- To avoid mistakes; aim to preserve autonomy and group status, and avoid irreversible decisions
- To act; confident we can make an impact and feel what we do is important
- Favor simple-looking options and complete information over complex, ambiguous options

Cognitive Bias Codex; share-alike

WHAT SHOULD WE REMEMBER?

- Discard specifics to form generalities
- Edit and reinforce some memories after the fact
- Store memories differently based on how they were experienced

Cognitive Bias Codex; share-alike

SOURCES OF BIAS THAT MAY AFFECT FORENSIC DECISON MAKING

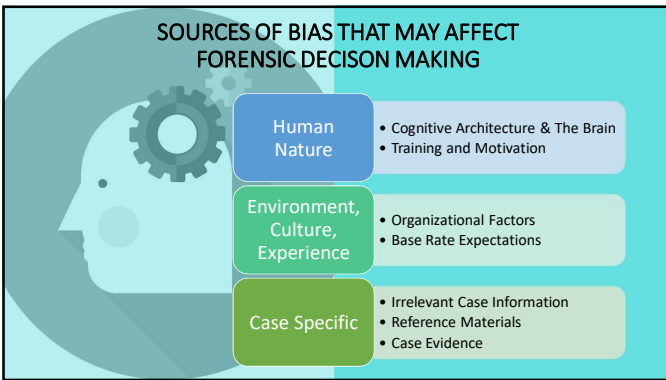| Human Nature | • Cognitive Architecture & The Brain
• Training and Motivation |
| Environment, Culture, Experience | • Organizational Factors
• Base Rate Expectations |
| Case Specific | • Irrelevant Case Information
• Reference Materials
• Case Evidence |

OVERCOMING BIAS MYTHS

❌ Bias can be managed by willpower

❌ All bias results in error

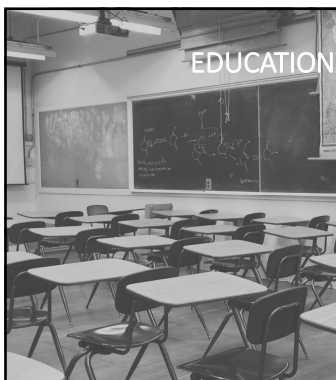❌ Bias reducing steps will prevent all error

Take a System's Approach

Balance actions to reduce bias with practical considerations in a cost/benefit analysis

Skills
Efficiency
Communication
Workload
Error Reduction
Risks

EDUCATION & TRAINING

- Those closest to the problem are closest to the solution

- Awareness can propagate discussion on risks/benefits

- Training and action needed to determine effective needs to reduce bias

QUALITY ASSURANCE

Conformance To Customer Expectations
Delivery Speed
Quality Assurance
Continuous Improvement
User Satisfaction

- Consider where in the DNA process flow an analyst may be exposed to bias and what reasonable actions can reduce the risks of cognitive contamination

- Quality manual and/or technical procedures address assessment with written guidelines

- Consider transparency (i.e. documenting exposure to possible biasing elements)

INFORMATION CONTROL

- What the eyes see and the ears hear, the mind believes

- Example:
  - Gun found in John Smith's car, please compare the swabs from the gun to John Smith

- Context management
  - Case Manager approach
  - Laboratory/reporting analyst independent of communication analyst

Task Information- Influence Decision Making

Justify relevancy in QA Manual

RELEVANT

Examples	
Date of Crime	Age of evidence
Storage Conditions	Evidence exposure
Type of Crime	Influence technical procedures
Intimate v Non-Intimate	Assumptions used in interpretation

Task Information- Influence Decision Making

How to mitigate exposure?

IRRELEVANT

Examples	
Eyewitness information	Details about the scene or who was involved
Results of other forensic examinations	Presence or lack of other forensic evidence
Personal History	Suspect criminal history, victim use of drugs or alcohol

DATA INTERPRETATION

Document and annotate evidence sample data (even if use software for assistance)
- Profile quality
- Number of contributors
- Assumptions
- Mixture contributions
- Potential for drop out
- Suitability for comparison

DATA INTERPRETATION

- LSU or Linear approach

- Document any changes to interpretation if/once exposed to reference standard

TECHNICAL REVIEW

- Critical step as 100% of DNA case files undergo review

- If take a cognitive approach may reduce many influences of bias from information, interpretation, and analysis
  - Review assignments
  - Blind verification
  - Dispute resolution
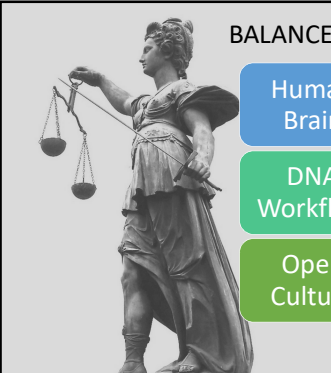
- Retain all notes from review

TECHNICAL LEADER ROLE

Current Culture- Hierarchical Approach
- Resolves disputes
- Risk of *priori* favoring
- Final/correct answer

Open Culture Possibilities
- Document disagreements in the case file
- Report disagreements as inconclusive -OR-
- Report all conclusions

BALANCE ACTIONS AGAINST RISK

Human Brain	• Utilizes a whole range of cognitive processes: past experience, expectations and context
DNA Workflow	• Training, quality assurance, information control, data interpretation, case review
Open Culture	• Acknowledgement of cognitive risks, transparency, and documentation

STAY BALANCED

Educate yourself	• Web based training, journals, experts
Low Hanging Fruit	• Obvious/easy solutions to mitigate bias
Risk Assessment	• Address difficult suggestions

THANK YOU

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THANK YOU

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