

# Reducing bias in forensic & clinical decision-making

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JOSEPH LOCKHART, PHD, ABPP

SATY SATYA-MURTI, MD, FAAN

# Outline of This Presentation

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## 1. Lockhart:

- Introduction
- Definition and ethical issues
- Major Forensic Examples (*as per Dror*)

## 2. Satya-Murti:

- Ubiquity of bias
- Types of Bias
  - Day-to-day, and clinical examples

## 3. Lockhart:

Allegiance bias and “blind spot” bias

## 4. Satya-Murti:

De-biasing research in clinical arena  
Outline of De-Biasing techniques

## 5. Lockhart:

Bias prevention ideas  
Bias and the expert witness

Q & A



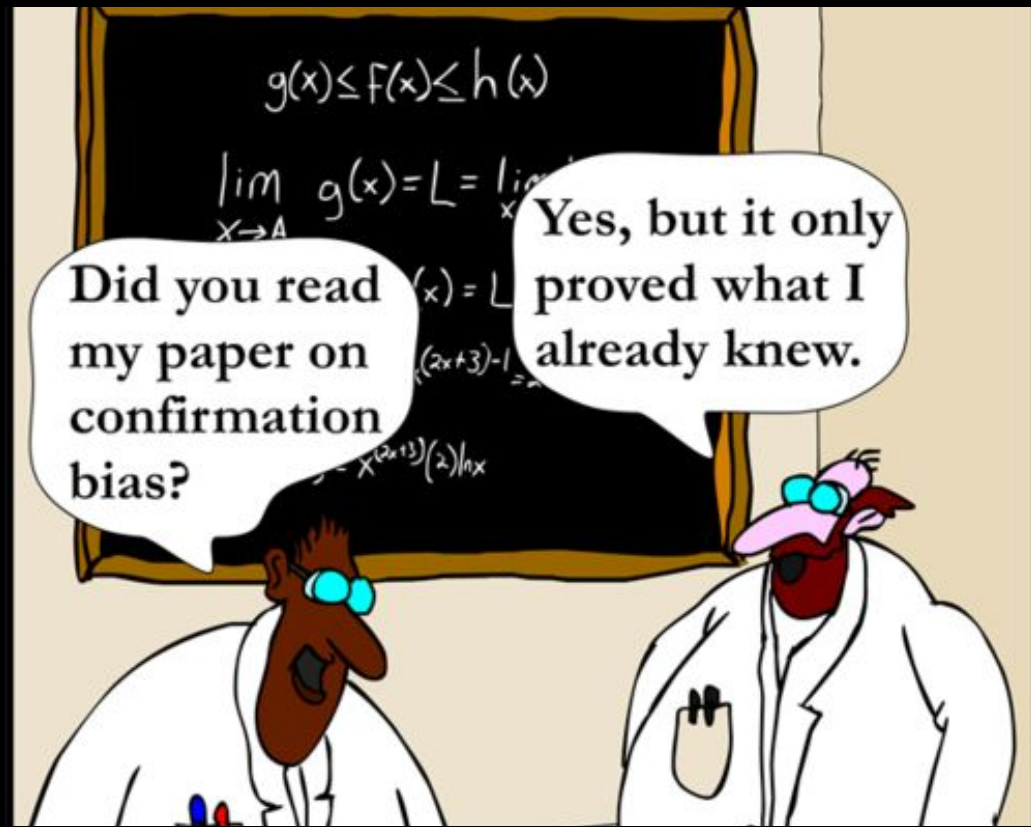
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Should we worry  
about bias in decision-  
making?



Bias is pervasive.  
It affects every, and all, aspects of life



## **DAY TO DAY LIFE**

**History  
Warfare  
Politics**



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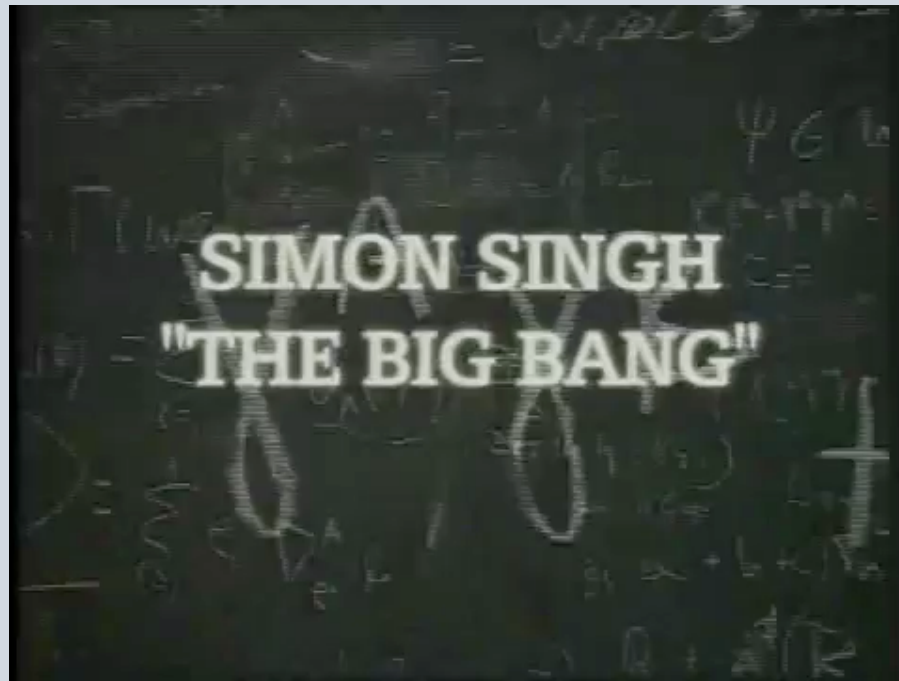
## **CLINICAL MEDICINE**

**FORENSIC PRACTICE**



## An example from led zeppelin

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# A working definition of confirmation Bias

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“In [confirmation bias], one selectively gathers, or gives undue weight to, evidence that supports one's position while neglecting to gather, or discounting, evidence that would tell against it. “

Nickerson, R. S. (1998). Confirmation bias: A ubiquitous phenomenon in many guises.  
*Review of General Psychology*, 2(2), 175.

# Ethical issues for forensic psychologists

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- Forensic practitioners...
  - strive for accuracy,, fairness, and independence.
  - strive to treat all participants and weigh all data, opinions, and rival hypotheses **impartially**.
  - strive to be unbiased and impartial

*SGFP, Guidelines 1.01 and 1.02 (APA, American Psychologist, January, 2013)*

# Ethical issues

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**"When psychiatrists function as experts in the legal process, they should adhere to the principle of honesty and should **strive for objectivity**. Although they maybe retained by one party to a civil or criminal matter, psychiatrists should adhere to these principles when conducting evaluations, applying clinical data to legal criteria, and expressing opinions."**

*Ethical Guidelines for the Practice of Forensic Psychiatry, 2005, [www.aapl.org](http://www.aapl.org). Section IV*

# Examples of real-world forensic Bias

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- **Fingerprint analysis**
- **DNA admixture**
- **Hair Analysis**

# Examples of Bias

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## Fingerprint analysis

When intentionally provided with misleading contextual information (e.g., confession), fingerprint analysts changed their prior classification 80% of the time.

- Itiel E. Dror, David Charlton, & Ailsa E. Péron. (2006). *Contextual information renders experts vulnerable to making erroneous identifications*. *Forensic Science International*, 156(1), 74–78.



# Examples of Bias

## DNA Admixture

17 North American expert DNA examiners were asked for their interpretation of data from an adjudicated criminal case, they produced inconsistent interpretations. The majority of 'context free' experts disagreed with the laboratory's pre-trial conclusions, suggesting the extraneous context of the criminal case may have influenced the interpretation of the DNA evidence

- *Subjectivity and bias in forensic DNA mixture interpretation. IE Dror, G Hampikian - Science & Justice, 2011*



# Examples of Bias

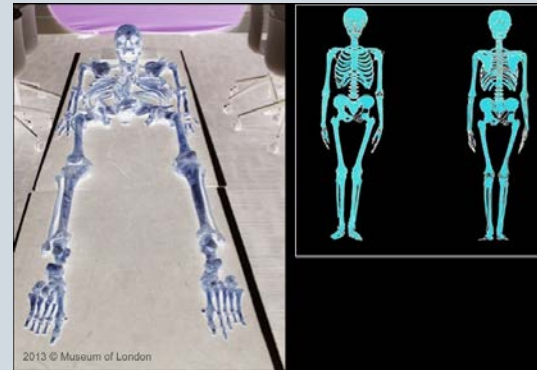
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## Forensic Anthropology In assessment of sex

**31%** of the participants in the control group concluded that the skeleton remains were **male**.

**72%** concluded that the remains were male in the group that received contextual information that the remains were **male**.

**0%** of the participants concluded that the remains were **male** in the participant group where the context was that the remains were of a female.



# Examples of Bias

## Hair Analysis

Of 28 examiners with the FBI Laboratory's microscopic hair comparison unit, 26 overstated forensic matches in ways that favored prosecutors in more than 95 percent of the 268 trials

THE FBI FAKED AN ENTIRE FIELD OF FORENSIC SCIENCE

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JURISPRUDENCE THE LAW, LAWYERS, AND THE COURT.  
APRIL 22 2015 5:09 PM

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### Pseudoscience in the Witness Box

The FBI faked an entire field of forensic science.

By Dahlia Lithwick



The Washington Post reported that flawed forensic hair matches might have led to possibly hundreds of wrongful convictions for rape, murder, and other violent crimes.

Photo by Victorburnside/Thinkstock

For more stories like this, like **Slate** on **Facebook** and follow us on **Twitter**.

The **Washington Post** published a story so horrifying this weekend that it would stop your breath: "The Justice Department and FBI have formally acknowledged that nearly every examiner in an elite FBI forensic unit gave flawed testimony in almost all

Bias is pervasive.  
It affects every, and all, aspects of life



## DAY TO DAY LIFE

History  
Warfare  
Politics

CLINICAL MEDICINE

FORENSIC PRACTICE



History  
Warfare  
Politics

CLINICAL ME  
FORENSIC  
PRACTICE

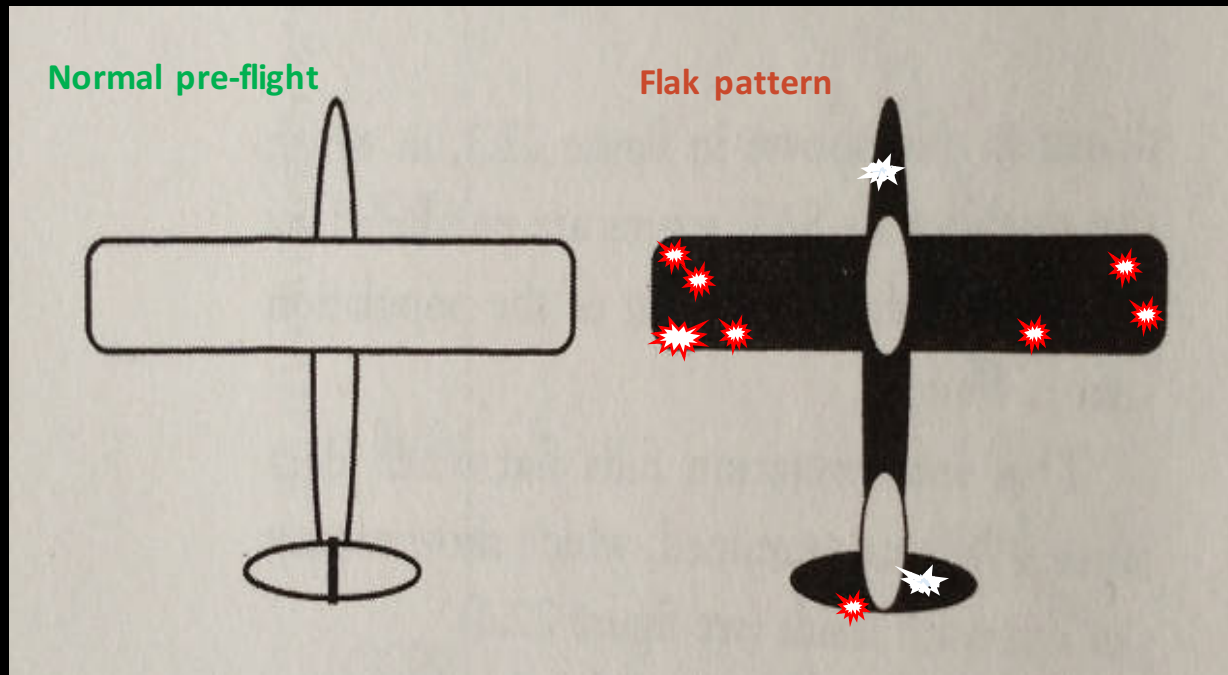


## How difficult it is to acknowledge error!

Illustration of confirmation and blind spot biases.

- "I can say that I apologize for the fact that the intelligence **we** received was **wrong** because, even though he (-----) had used chemical weapons extensively against his own people, against others, the program in the form that we thought it was did not exist in the way that we thought."

*Ex-British PM Tony Blair apologizes for Iraq War 'mistakes'.*  
USA TODAY 10.25.2015



- Statistical analysis reveals certain **flak distribution patterns** (as above)
  - Military analysts ask for **extra armor** added to where holes clustered
  - Wald challenges this and recommends “**consider just the opposite**” – do not add additional protection to those areas
- If you do then it will **increase** your bomber loss ratio, **not reduce** it.

# Because



- You are limiting your observations to those planes that survived the bombing raid and returned home
- Those that plunged and were lost did not return, because they were hit in the non-pattern areas . They were destroyed
- Therefore, reinforce those areas not shown in the returning planes.



DAY TO DAY  
LIFE  
History

## Survivorship Bias

- Focusing on available evidence only
- Ignoring missing evidence
- Not seeking contrary evidence
  - Those who survived (returned from a raid).
  - Those who prayed and survived a shipwreck
  - Even though we predict risk, we do not know outcomes after release



## Cognitive errors have been with us for a long time.

The human understanding when it has once adopted an opinion (either as being the received opinion or as being agreeable to itself) **draws all things else to support and agree with it.**

*Francis Bacon*

*c. 1620*

In the last analysis, we see only what we are ready to see, what we have been taught to see. We **eliminate and ignore everything that is not part of our prejudice.**

*Charcot.*

*C. 1870s*

History is so indifferently rich that a case for **almost any conclusion** from it can be **made by a selection** of instances.

*Durant and Durant, The Lessons of History,*

**1968**

## Some of the Commonly Encountered Biases in Clinical Arena

- Confirmation Bias
- Retrospective (hind sight) Bias
- Allegiance Bias
- Ignoring Prevalence Bias (Base-rate bias)

## Illustrative cases

### Multiple biases

- 32 yr F. Lt arm tingling, M.S. in cousin, domestic stress, MRI small parietal T2 hyperdense spot. IV Prednisolone. Better.
- 6 wks later, tingly hands, facial numbness, thick speech. MRI no change. Dx: worsening MS.
- Air ambulance to tertiary center.

## Another illustrative Case

### Retrospective Bias

Setting	50 yr M. new onset low back pain a few months. Active, healthy, overachiever. Normal exam. "Choosing Wisely" physician did not image. Symptomatic Rx. Come for f/up. 7 days
Outcome	Felt so well, chose to wait. ....
Potential Trial	3 wks later acute urinary retention, catheter in, gait trouble Multiple spine mets.

**Defence:** Followed guideline, Pt. failed to keep f/up. No "red flags." Where is personal responsibility?

Decision made under available conditions.

**Outcome:** yet unknown.

Guidelines acknowledge exceptions, Physician must have imaged at first contact in the context of a "never complains" patient.

Retrospective opinion, bias prone.

**Outcome:** known

# Allegiance bias

## Are Forensic Experts Biased by the Side That Retained Them?

*(Murrie, Boccaccini, Guarnera, & Rufino, 2013)*



# Allegiance bias

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- Subjects believed they were hired by either
  - defense
  - or*
  - prosecution.

Examined two risk assessments: PCL-R *and* STATIC-99R

- **Clear pattern of ratings emerged consistent with retaining side (up to  $d=.84$ ) in some cases.**

*(Murrie, Boccaccini, Guarnera, & Rufino, 2013)*

# Confidence and accuracy

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- Confidence and accuracy in assessments of short-term risks presented by forensic psychiatric patients (Desmarais, Nicholls, Read, & Brink, 2010)
- Clinical vs. statistical prediction: “Adjusting” estimates of risk on the STATIC-99 based on external factors typically makes prediction LESS accurate.
  - (DeClue, 2013); (Hanson, Helmus, & Harris, 2015)
- Confidence not closely associated with accuracy in cardiac diagnostic evaluation (Cavalcanti & Sibbald, 2014).
- But, see (Douglas & Ogloff, 2003)

# We are far better at recognizing bias in others, rather than ourselves

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*Neal, T. M. S., & Brodsky, S. (n.d.). Forensic psychologists' perceptions of bias and potential correction strategies in forensic mental health evaluations. Psychology, Public Policy, and Law.*



## The “Blind Spot” Bias

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- ✓ Experts were surveyed, and found:
- ✓ Most recognized bias in other experts, but believed they and their colleagues were unbiased.
- ❖ Experts used many approaches to avoid bias, but most had been shown to be ineffective, including:
  - ❖ Introspection of personal biases
  - ❖ Reflection on case
  - ❖ Loyalty to doing a “good job”

Neal, T. M. S., & Brodsky, S. (n.d.). Forensic psychologists' perceptions of bias and potential correction strategies in forensic mental health evaluations. *Psychology, Public Policy, and Law*.

# Base-rate bias

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Empirical evidence that disease prevalence may affect the performance of diagnostic tests with an implicit threshold: a cross-sectional study.

*Willis, B. H. BMJ Open, 2(1), (2012).*

*Walters, Kroner, DeMatteo, & Locklair, 2014*

# What next?

- Is bias **inevitable** and ubiquitous?
- Is it a **normal** operating characteristic of our brains?

- Is it even **possible to escape** bias?



- We can certainly **aspire**
  - For **Awareness** that bias exists in us and others, and
  - To **Minimize** bias

## **What is debiasing**

Does it work

Will it work in all bias inducing situations

What is the experience so far in clinical care

Will it work in forensic arena



# Debiasing evidence review

Experiment or Review Method	Findings	Suggestions or Conclusions
Lichtenfeld 2009. Narrative, experiential essay. Emphasis: conf. bias and debiasing methods.	Extensive cataloging of cognitive biases	Paucity of research and mixed evidence on efficacy of debiasing.
Graber 2012. Narrative review of 141 articles on interventions to reduce diagnostic errors	Lack of evidence for most interventions	A few helpful with trainees. Field is immature.
Sherbino 2014 (n=191). Emergency medicine rotation students using computerized decision support to reduce diagnostic errors.	Computerized decision support reduced errors	Computerized decision support may modify nonrational decision factors do not have
Stiegler 2014. Review of decision making models and statistically derived factors in anesthesiology errors.	Statistically derived factors in anesthesiology errors	Statistically derived factors in anesthesiology errors
Normal 2014 (n=214). Two residents compared for diagnostic accuracy	Two residents compared for diagnostic accuracy	Two residents compared for diagnostic accuracy
Blumenthal-Barby 2015. Review original, peer reviewed empirical studies of medical decision making (1980 and 2010)	Review original, peer reviewed empirical studies of medical decision making (1980 and 2010)	Studies on bias and heuristics of medical decision making should focus more on actual rather than hypothetical situations. Patients are studied more often than medical personnel. Terminology used in cognitive bias studies are not standardized.
Balogh 2015. NAP Book. Review of evidence about diagnostic errors, and recommendations for improvement	Most persons experience 1 diagnostic error, and some suffer serious consequences. Failed heuristics and cognitive biases may lead to errors. Effects of debiasing, while debatable, may be helpful in certain situations as emergency rooms.	More research is needed in this area.
Monteiro 2015. 47 medical residents. Reflect and revise diagnoses for 16 cases	Unstructured reflection of cases had a small benefit.	Diagnostic performance is modulated by experience and knowledge
Smith, Black 2015. Debiasing workshop for 19 family medicine residents. Objective: to increase residents awareness of their cognitive bias leading to misdiagnosis.	In spite of positive trends, statistically significant improvements did not occur.	Educating trainee physicians in risks of bias and misdiagnosis may not be effective.

You don't have to read this.  
Summary on next slide.



# Debiasing

## Evidence Review

### What does it tell us?

#### Findings

There are more studies in cognitive psychology field, and far fewer in clinical medicine

Some positive trends.

- Checklist in ICU and surgery

- Curriculum addition among trainees

Negative results also evident

#### Suggestions

Field needs to mature. Need real-life, not hypothetical situations

Terminology not standardized

Clinical & cognitive psychology fields need to collaborate

## General Debiasing advise.

Type of cognitive error	Debiasing, after awareness and acceptance of need for change,
Confirmation bias	<b>Actively seek disconfirming data</b> ; is there evidence contradicting your hypothesis? <b>Consider the opposite</b> of your diagnosis or summation; disengage, when possible, from dual role of treating and being an expert witness
Hindsight/ Retrospective bias	While rendering an opinion, consider <b>what your decision (diagnosis) would have been if you were blind to the ultimate outcome</b>
Base rate bias	Before selecting case specific diagnosis or conclusions, <b>find out how common that diagnosis is</b> (base rates) among the possibilities in that population

*Modified from Satya-Murti S, Lockhart J. Recognizing and reducing cognitive bias in clinical and forensic neurology. Neurol Clin Pract. 2015;5(5):389–396.*

## De-biasing strategies

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Or, An ounce of Bias prevention is worth a pound of De-Biasing “Cure.”

- Bias prevention should be primary goal, with de-biasing techniques being secondary.
- Use de-biasing techniques when prevention is unavailable.

# Bias prevention strategy:

## “Linear sequential unmasking”

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Linear Sequential Unmasking (LSU) Approach for Minimizing Cognitive Bias in Forensic Decision Making (Dror et al., 2015)

**Level 1: Trace Evidence**

**Level 2: Reference materials**

**Level 3: Case information**

**Level 4: "Base rate" expectations**

**Level 5: Organizational and cultural factors**

# Bias Prevention strategies

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Control potentially biasing information from the beginning

Review most valid data first, before potentially biased (premature closure, dx momentum)

- Avoid “diagnostic momentum” by forming a tentative opinion BEFORE reading other experts’ conclusions
  - That way, you can pinpoint the evidence that changed your opinion

Sensitize yourself to potential biases (e.g., Jenkins & Youngstrom, 2016)

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# De-Biasing Techniques

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- Requires effortful processing (not merely “reflection”). E.g., actively seeking out evidence that is inconsistent with your conclusion
- Use checklists/objective measures where available (e.g., MacCAT-CA, ECST in CST evals). Witt (2010), MA CST Checklist, Skeem (1989) paper all included in materials
- Consult with a colleague who has minimal info, and who is not afraid to disagree with you.

# Recognition of Bias makes you a better expert Witness: Joel Dvoskin

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- ❖ If you only consider one side of the question, you are less likely to be seen as a credible witness.
- ❖ “There is no such thing as ‘THE TRUTH.’ ” (only objective facts and your opinion about them)
- ❖ You are evidence (like a maggot, but nicer)
- ❖ “Show your work” let the reader see the evidence for (and against) your conclusion
- ❖ Continually ask yourself, “How do I know that?”
- ❖ Remember, “IT’s NOT ABOUT YOU!”

**Thank you for listening to our**

unbiased  
presentation



*Saty Satya-Murti & Joseph Lockhart*

## LINKS TO ADDITIONAL RESOURCES

**These are links to Dropbox files of articles for checklists to use in forensic report-writing:**

**1. Checklist for CST reports from MA**

<https://www.dropbox.com/s/rz1jhc6trqd1mns/DubeCRreportwritingguidelinesrevised2002.pdf?dl=0>

**2. Skeem - Logic and reliability of CST Evaluations (valuable tool for examining your reasoning)**

<https://www.dropbox.com/s/cvovm4ihndudlbo/Skeem%20et%20al.%20-%201998%20-%20Logic%20and%20reliability%20of%20evaluations%20of%20competence%20copy.pdf?dl=0>

**3. Witt - General checklist for Forensic evaluations**

<https://www.dropbox.com/s/rgfdae qcj2vlyav/Witt%20C%20Phil%20-%20Forensic%20Psychology%20Report%20Checklist.pdf%20copy.pdf?dl=0>

**4. Grisso-Typical errors in forensic evaluations**

<https://www.dropbox.com/s/jmcikysz4kb23vf/Grisso%25202010-2%5B1%5D.pdf?dl=0>

**Contact: Jerry Lockhart (josephjlockhart@gmail.com)**