Reducing bias in forensic & clinical decision-making

JOSEPH LOCKHART, PHD, ABPP
SATY SATYA-MURTI, MD, FAAN
Outline of This Presentation

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
Should we worry about bias in decision-making?

Did you read my paper on confirmation bias?

Yes, but it only proved what I already knew.
Bias is pervasive. It affects every, and all, aspects of life.
An example from led zeppelin
A working definition of confirmation Bias

“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. “

Ethical issues for forensic psychologists

• 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)
"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."

Examples of real-world forensic Bias

- Fingerprint analysis
- DNA admixture
- Hair Analysis
Examples of Bias

Fingerprint analysis

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

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

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

<table>
<thead>
<tr>
<th>Multiple biases</th>
<th>• 32 yr F. Lt arm tingling, M.S. in cousin, domestic stress, MRI small parietal T2 hyperdense spot. IV Prednisolone. Better.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• 6 wks later, tingly hands, facial numbness, thick speech. MRI no change. Dx: worsening MS.</td>
</tr>
<tr>
<td></td>
<td>• Air ambulance to tertiary center.</td>
</tr>
</tbody>
</table>
### Another illustrative Case

**Retrospective Bias**

<table>
<thead>
<tr>
<th>Setting</th>
<th>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</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outcome</td>
<td>Felt so well, chose to wait. …………..</td>
</tr>
<tr>
<td>Potential Trial</td>
<td>3 wks later acute urinary retention, catheter in, gait trouble Multiple spine mets.</td>
</tr>
</tbody>
</table>

**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

• 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 $d=0.84$) in some cases.

*(Murrie, Boccaccini, Guarnera, & Rufino, 2013)*
Confidence and accuracy

• 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

The “Blind Spot” Bias

✓ 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”

Base-rate bias

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
<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Study Design</th>
<th>Findings</th>
<th>Suggestions or Conclusions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lichtenfeld 2009</td>
<td>Narative Experimental Essay</td>
<td>Extensive cataloguing of cognitive biases</td>
<td>Faculty of research and mixed evidence on efficacy of debiasing.</td>
<td></td>
</tr>
<tr>
<td>Graber 2012</td>
<td>Narrative Review of 141 articles on interventions to reduce diagnostic errors</td>
<td>Lack of real-world situations. A few helpful with training. Field is immature.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Graber 2014</td>
<td>Review of decision making models: statistically derived factors in anesthesia errors</td>
<td>MODIFY: noncognitive decision factors are removed.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Graber 2014</td>
<td>Review of decision making models: statistically derived factors in anesthesia errors</td>
<td>MODIFY: noncognitive decision factors are removed.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stieglitz 2014</td>
<td>Review of decision making models: statistically derived factors in anesthesia errors</td>
<td>MODIFY: noncognitive decision factors are removed.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blumenthal-Baety 2015</td>
<td>Review original peer reviewed empirical studies on cognitive biases and heuristics in medical decision making (1980 and 2013, n=213)</td>
<td>Studies on bias and heuristics of medical decision making need to 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.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Balagh 2015</td>
<td>NAP Review</td>
<td>Review of evidence about diagnostic errors, and recommendations for improvement</td>
<td>More research is needed in this area.</td>
<td></td>
</tr>
<tr>
<td>Montalvo 2015</td>
<td>Medical residents</td>
<td>Unstructured reflection of cases had a small benefit.</td>
<td>Diagnostic performance modulated by experience and knowledge.</td>
<td></td>
</tr>
<tr>
<td>Smith, Sibbald 2015</td>
<td>Debriefing workshop for family medicine residents</td>
<td>In spite of positive trends, statistically significant improvements did not occur.</td>
<td>Educating trainee physicians in risks of bias and misdiagnosis may not be as effective.</td>
<td></td>
</tr>
</tbody>
</table>
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.

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

De-biasing strategies

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”

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

De-Biasing Techniques

• 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

- 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**

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%20%20of%20competence%20copy.pdf?dl=0

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

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)