

Cognitive Errors and Unintended Biases: A Very Quick Review

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[Note: In academic and research domains, several errors and biases predictably occur. How to recognize and begin rising above these was a major focus of Dr. Moody's highly interactive sessions at Middlesex Community College]

1. Findings observed in almost a decade of operation of the Project Implicit web site.

Three major researchers (at Harvard and the Universities of Washington and Virginia) created a website for self-administered Implicit Association Tests. More than 5 million visitors have taken the tests. Other countries have started participating. (Excerpt below is from the Project website at implicit.harvard.edu) Link: <http://projectimplicit.net/generalinfo.php>

- **Implicit biases are pervasive.** They appear as statistically "large" effects that are often shown by majorities of samples of Americans. Over 80% of web respondents show implicit negativity toward the elderly compared to the young; 75-80% of self-identified Whites and Asians show an implicit preference for racial White relative to Black.
 - **People are often unaware of their implicit biases.** Ordinary people, including the researchers who direct this project, are found to harbor negative associations in relation to various social groups (i.e., implicit biases) even while honestly (the researchers believe) reporting that they regard themselves as lacking these biases.
 - **Implicit biases predict behavior.** From simple acts of friendliness and inclusion to more consequential acts such as the evaluation of work quality, those who are higher in implicit bias have been shown to display greater discrimination. The published scientific evidence is rapidly accumulating. Over 200 published scientific investigations have made use of one or another version of the IAT.
 - **People differ in levels of implicit bias.** Implicit biases vary from person to person - for example as a function of the person's group memberships, the dominance of a person's membership group in society, consciously held attitudes, and the level of bias existing in the immediate environment. This last observation makes clear that implicit attitudes are modified by experience.
2. **Biases can be negative or positive.** A few years ago, the Swedish Research Council made an astonishing discovery: a female applicant for SRC post-doctoral funding had to have 2.5 times greater credentials (articles published, etc.) than a male applicant—just to reach the threshold of “competency,” enabling her to have her proposal reviewed by a panel. [Wenneras, C. & Wold, A. (1997). Nepotism and sexism in peer-review. *Nature* 387: 341-3.] Another way to view the findings: men's track records could be considerably weaker but they would still be deemed competent. The remedy for this inequity? Merely removing names from the applications.
3. **Even a tiny negative bias will produce cumulative disadvantages; a tiny positive one will produce cumulative advantages.** Computer modeling clearly shows this. In 2006, the National Academy of Sciences drew on hundreds of research studies showing how women in science and engineering fields are shortchanged. Some attention was also paid to the shortchanging of domestic, U.S. minorities. The excerpts below are from page 114 of the Academy's report *Beyond Bias and Barriers: Fulfilling the Potential of Women in Academic Science and Engineering*. The full report is at: www.nap.edu.

“Through a scientific or engineering career, advancement depends on judgments of one's performance by more senior scientists and engineers. A substantial body of research shows these

judgments contain arbitrary and subjective components that disadvantage women [that is, subtract points from their intellectual competency]. The criteria underlying the judgments developed over many decades when women scientists and engineers were a tiny and often marginal presence and men were considered the norm.”

“Gender bias—often unexamined, and held and acted on by people of both sexes who believe themselves unbiased—has affected many women scientists’ chances of career progress. Minority-group women face the double bind of racial and gender bias.”

“Incidents of bias against individuals not in the majority group tend to have accumulated effects. Small preferences for the majority group can accumulate and create large differences in prestige, power, and position. In academic science and engineering, the advantages [that is, added points] have accrued to white men and have translated into larger salaries, faster promotions, and more publications and honors relative to women.”

4. **Political leaders, ordinary people, and sophisticated capitalist investors all fall victim to predictable flaws in their thinking and decision-making.** See Daniel Kahneman’s *Judgment Under Uncertainty: Heuristics [shortcuts] and Biases* and dozens of other publications. Psychologist Kahneman’s focus on cognitive biases led him to co-found behavioral economics and also prospect theory, for which he received the Nobel Prize in Economics in 2002 (though he had *never* taken an economics course). Also see: Tversky, A. & Kahneman, D. (1981). The Framing of Decisions and the Psychology of Choice. *Science* 211: 453-458. Also: M. Benaji et al (2003). How (Un)ethical Are You? *Harvard Business Review* Dec. 2003: 1-11.
5. **In medicine, “predictable and preventable cognitive errors” mar diagnosticians’ cognitive processes and decisions** (Groopman). Three examples include: rushing to closure; failing to revise first impressions (a kind of “anchoring”); selectively choosing information that supports one’s initial hunch. There are more, unfortunately.

Groopman, Jerome (2007). *How Doctors Think*. (Boston: Mifflin).
Redelmeier, Donald (2005). The Cognitive Psychology of Missed Diagnoses. *Annals of Internal Medicine* 142 (2): 115-120.
Croskerry, Patrick (2003). The Importance of Cognitive Errors in Diagnosis and Strategies to Minimize Them. *Academic Medicine* 78(8): 775-780.
Singh, H. et al (2006). Understanding Diagnostic Errors in Medicine: A Lesson from Aviation. *Quality and Safety in Health Care* 215(3): 159-164.
Bond, W.F. et al. (2004). Using Simulation to Instruct Emergency Medicine Residents in Cognitive Forcing Strategies. *Academic Medicine* 79:438-446.
Phelps. E. et al (2000). Performance on Indirect Measures of Race Evaluation Predicts Amygdala Activation. *Journal of Cognitive Neuroscience* 12(5): 729-738.
6. **The good news:** At times all of us (most of us?) unwittingly make cognitive errors and rely on positive and negative group biases, but there are several ways to prevent or diminish these. Using brain-imaging technology, neuroscientists are beginning to pinpoint the brain areas activated as we learn to self-correct/minimize predictable errors and become “primed” to develop **new cognitive habits**.