

How heuristics and mental biases contribute to over diagnosis

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INTRODUCTION

HEURISTICS:

A set of learned or hardwired internal cognitive biases that drive a surprisingly large amount of human choice.

- Straightforward and practical, though imperfect, decision-making tools. Allow “fast and frugal” estimates.
- Heuristics can lead us toward error, but also can be helpful in complex environments.

THE RATIONAL ACTOR MODEL:

A theory of how we make decisions: if humans have the right facts we make the correct choice; poor decisions are due to lack of information.

- This often appears the “de facto” framework assumed by researchers, policy makers and clinicians. This assumption ignores decision making research

COMMONLY ACCEPTED HEURISTICS

REPRESENTATIVENESS:

Making judgments about the probability of an event under uncertainty.

Assessing similarity of objects and organizing them based on category prototype, i.e. “like goes with like”.

- Base rate fallacy: applying high sensitivity tests to rare diseases may overestimate the likelihood of disease.¹
- Small samples are perceived to be as representative as large samples, small studies tend to be over-generalized.
- Excluding multi-morbid patients while researching discreet illness often overestimates benefits of intervention.²

FAMILIARITY:

Individuals assume that the circumstances underlying the past behavior still hold true for the present situation

- Consumers often buy the same brand repeatedly. Physicians use the same medication.
- Samples and direct-to-consumer advertising are effective at increasing prescriptions.
- Patients prefer brand names over generic medications, even when they are chemically identical.
- Familiarity is part of the “long tail” of habits, including medical training.

ESCALATION OF COMMITMENT / SUNK COST FALLACY:

Continuing to use ideas or approaches that, based on a fresh look with current information, would not be chosen.

- Individual physicians tend to be conservative about revising their diagnostic probabilities. The can coincide with “anchoring”, where the first piece of information is relied upon too heavily.
- Initially sensible stances either become outdated or concepts grow beyond initially intended frameworks to blind us to other approaches.³
- The National Institutes of Mental Health rejected Diagnostic and Statistical Manual (DSM) labels in favor of “research domain criteria” which better reflect science,⁴ yet DSM taxonomy dominates.

AVAILABILITY HEURISTIC:

People make judgments about the probability of events by the ease with which examples come to mind.

- Concepts and products which are financially supported will be more available: advertising works.
- Interesting, rare or provocative events or research tend to be covered in the news and medical journals, then are in the mind of physicians and /or patients.⁵
- Easily measured variables, for instance lab values, medications or BMI /weight get studied more often.
- Cardiorespiratory fitness, electronic media exposure and nutrition are critical variables regarding health. Yet lifestyle factors are difficult to study, appear in the medical literature less often and are less “available”.

NARRATIVE FALLACY:

We like stories and if a story is lacking, we often make up a story⁶.

- Many stories, such as saturated fat and cholesterol are the primary drivers of heart disease fit only portions of the data yet became widely accepted
- Medications alter the story about the cause of a problem: the “serotonin hypothesis” as the cause of depression after the introduction of Prozac.
- Complex dynamic biological systems get presented as static and linear, creating a distorted view of reality and contributing to poor outcomes.⁷

CONSIDERATIONS FOR PUBLIC HEALTH

- Supporting and encouraging health care professionals to practice healthy lifestyles would likely make these foundations of health more “available” and increase provider’s emphasis on self care.
- In complex risk opaque environments, focusing on simple heuristics can lead to better decisions.⁸
- The triad “Eat Food, Get up and Move, and Honor Silence”⁹ are simple rules of thumb for well-being.

CONCLUSIONS

- Modern medicine deals with difficult decision making under extreme complexity. The public, researchers, administrators and physicians alike share cognitive biases which affect their judgments and contribute to overdiagnosis.
- Researchers, physicians, administrators and systems planners should be familiar with these quirks of judgment in order to guard against their undue influence on research, medical systems and individual health decisions.

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