

Niagara University Psychology Fair

WHAT ARE THE CHANCES? Probability Estimation & Decisions Under Uncertainty

Many of our decisions involve **probability estimations**. For example, in deciding whether or not to get a flu shot this year, you may estimate how likely it is that you'll be exposed to the flu. Will you take a car or a plane on your next vacation? That may depend, in part, on how safe you think air travel is.

In general we are good at making decisions, but we also make errors. Some errors are caused by our **decision-making strategies**. In most cases, our strategies help us make good decision, but sometimes they lead us astray. Below are some examples.



Source: AP Photos

<p>Suppose you toss a fair coin 10 times. Which outcome is more likely?</p> <p>A. TTTHHHHTHT</p> <p>B. TTTTTTTTTT</p>	<p>Are there more English words that begin with K, or have K as the third letter?</p> <p>K _____</p> <p>___ K _____</p>	<p>Mary is 31 years old, outspoken, and very bright. She majored in philosophy in college, was deeply concerned with issues of social justice, and participated in anti-war demonstrations. Is Mary more likely to be a bank teller, or a feminist bank teller?</p>
---	---	---

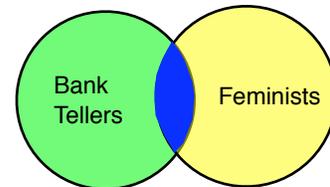
The correct order for these 8 causes of death (average number of deaths in the US per day)



The “coin toss” question is kind of tricky. The two sequences of heads and tails are actually equally likely to occur ($1 \div 2^{10}$ or 1 in 1024). However, because we expect coin tosses to result in some heads and some tails, sequence **A** seems more likely than sequence **B**. In this case, our decision is influenced by a strategy known as the **representativeness heuristic**. We expect a small sample of coin tosses to be similar to (or representative of) the entire population of coin tosses that contains an equal number of heads and tails.

There are about twice as many words that have K as the third letter. But words that start with K are easier to think of, so we often guess there are more of them. This is an example of the **availability heuristic**, a strategy in which you judge that something is more common if it is easy to think of examples. That’s why many people guess that murder is more common than suicide — murders receive more publicity, so it is easier to remember examples.

Concerning Mary’s occupation, we have very little to go on. Most people choose feminist bank teller. However, she is more likely to be a bank teller since there must be far fewer feminist bank tellers (the blue area in the figure) than there are bank tellers. This error is called the **conjunction fallacy**.



It is important to remember that these decision making strategies usually lead us to the correct answer. For example, we judge correctly that cancer kills more people than asthma. However, by studying where we go wrong, psychologists not only help us understand ourselves better, but also pave the way to improving our ability to make important decisions.

Further Reading:

http://www.psychwiki.com/wiki/Representative_Heuristic

How We Know What Isn't So: The Fallibility of Human Reason in Everyday Life, by Thomas Gilovich