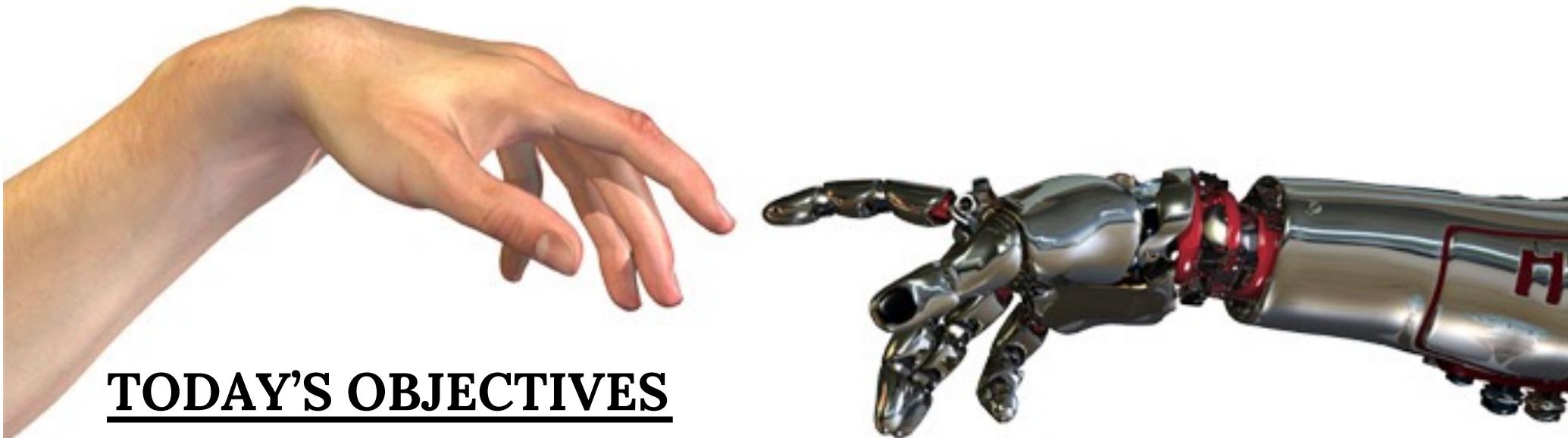


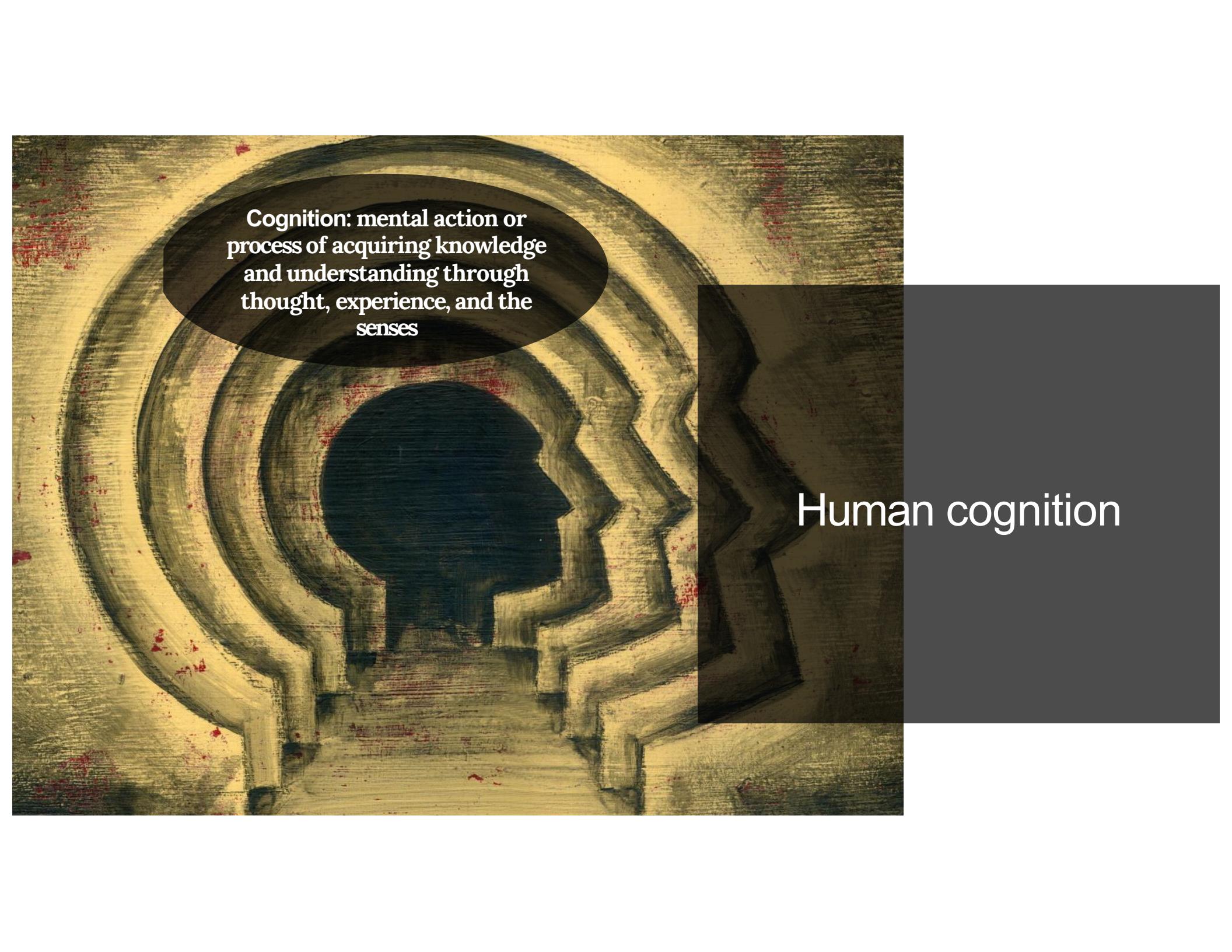
# Human-Computer Interaction

## Cognitive Bias in HCI Design - Part I



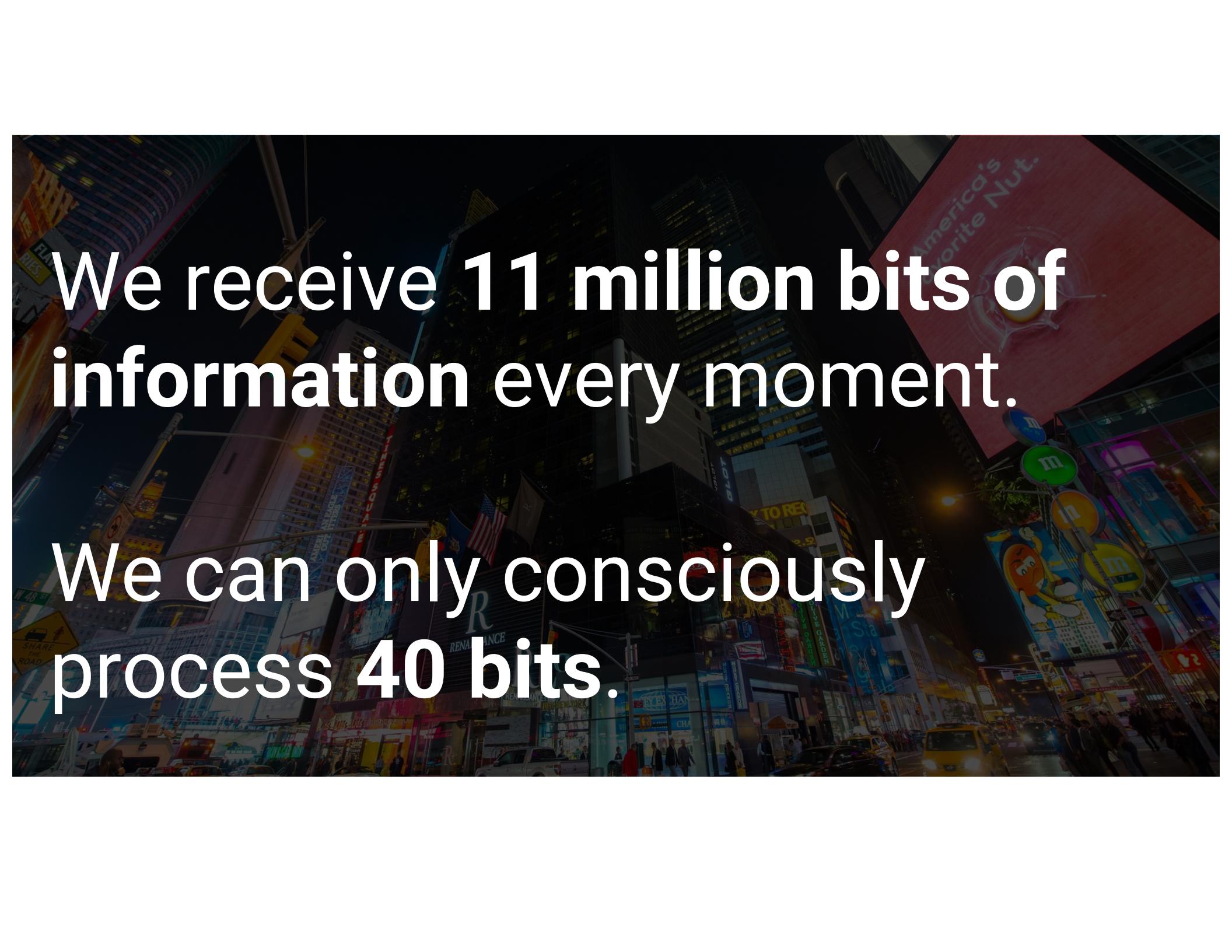
### TODAY'S OBJECTIVES

- 1.) Cognitive Bias
- 2.) Awareness and design implications in HCI systems



**Cognition:** mental action or process of acquiring knowledge and understanding through thought, experience, and the senses

Human cognition



We receive **11 million bits** of information every moment.

We can only consciously process **40 bits**.

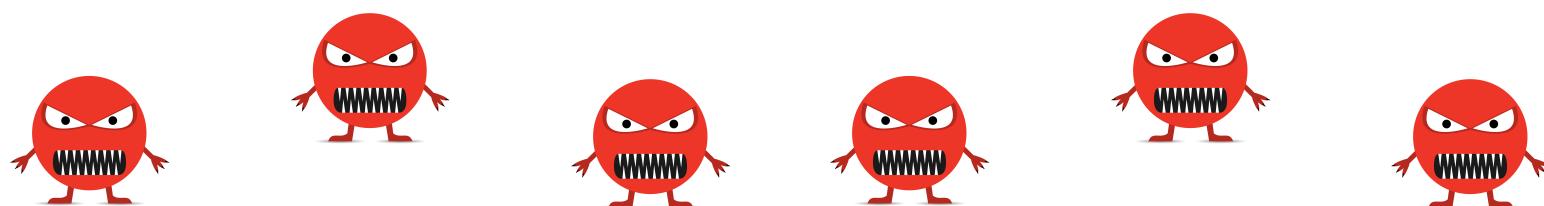
**99.999996%**  
**UNCONSCIOUS**

*...this is not your usual “diversity sensitivity” training.*

# Cognitive Bias – The Good, the Bad, the Ugly

HCI - Implications and why we cover in this course...

*Everything we do involves a human in some way or the other, otherwise it wouldn't be HCI.*



# Cognitive Bias

An automatic, **mental shortcut** used to process information and make decisions quickly. Cognitive biases are unconscious errors in thinking that arise from problems related to memory, attention, and other mental mistakes.



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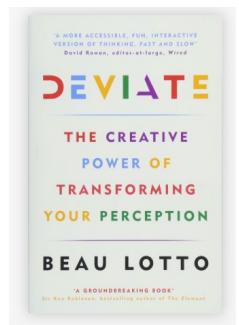
"You have no free will about what you're doing right now...everything is a reflex, grounded in assumptions. It comes from your personal and evolutionary history."

- Dr. Beau Lotto, well known neuroscientist specializes in the biology and psychology of perception

**TED Speaker**

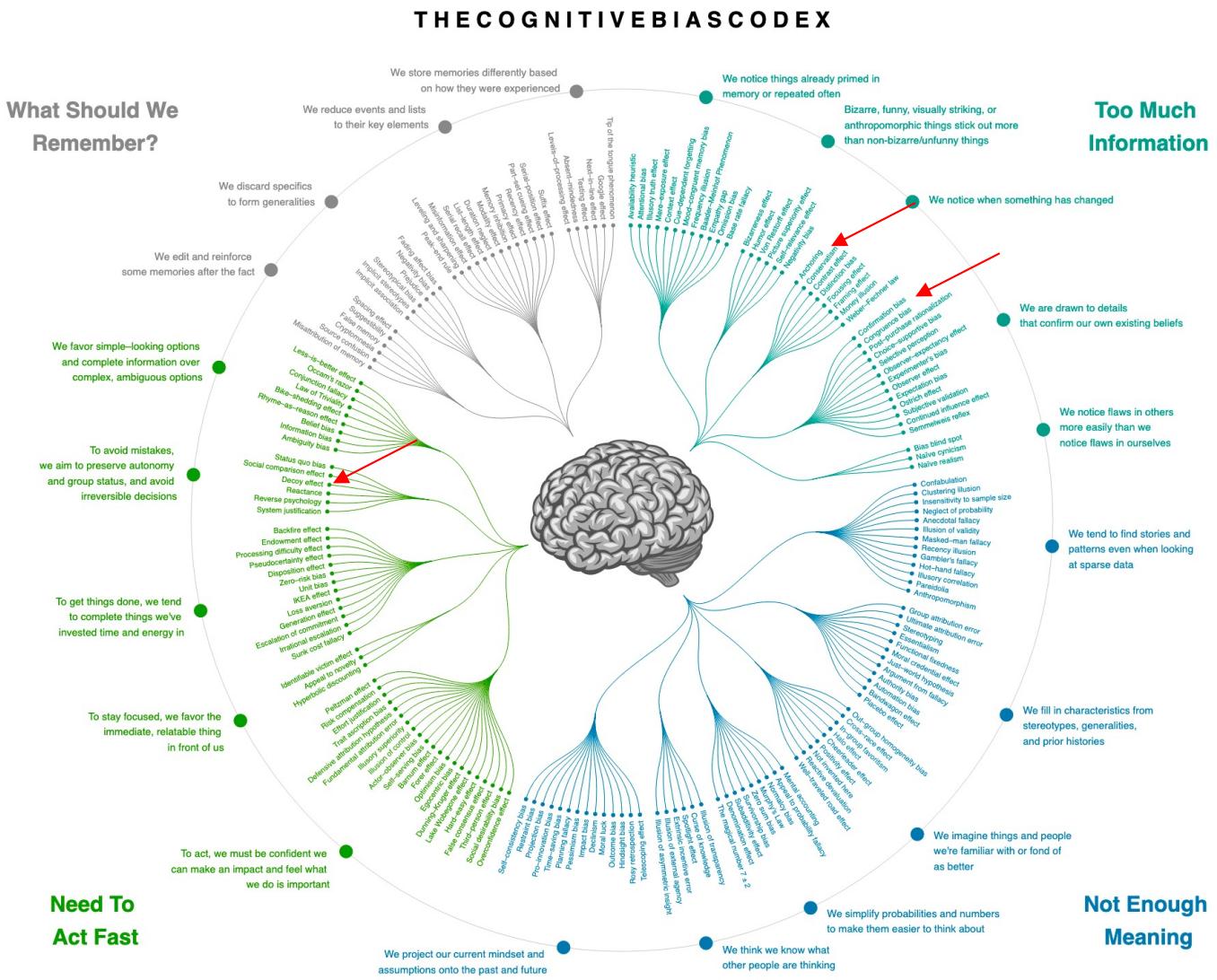
**Beau Lotto**  
Neuroscientist

[Lab of Misfits](#) [@BeauLotto](#)

A portrait of Dr. Beau Lotto, a man with long, light-colored hair and a beard, smiling. The text "TED Speaker" is in a small red box above his name. Below his name, it says "Neuroscientist". At the bottom, there are links to his lab website and Twitter handle.



# Types of Cognitive Bias (and they are plentiful!)



[https://en.wikipedia.org/wiki/List\\_of\\_cognitive\\_biases](https://en.wikipedia.org/wiki/List_of_cognitive_biases)



5-10%

# Anchoring Effect

People tend to focus on a single, initial piece of information, which influences how they estimate value and make subsequent decisions

The screenshot shows the Amazon eGift Card purchase interface. On the left, a preview of a \$50.00 Amazon gift card is displayed, featuring the Amazon logo and the text "Hope you enjoy this Amazon Gift Card!". Below the preview, there is a "Click image to preview" link. To the right of the preview, the product title "Amazon.com eGift Card" and the seller "by Amazon" are shown, along with a 4.5-star rating and 94,162 reviews. The main form area is divided into two sections: "1. Gift card design" and "2. Gift card details". In section 1, users can choose between "Standard", "Animated", or "Your Photo" designs, with the "Amazon Logo" selected. There are also five sample designs shown: "amazon", "Happy Birthday", "Good JOB", "Halloween", and "See more". In section 2, users can enter the "Amount" (\$25, \$50, \$75, \$100, \$150, or "Enter amount"), choose "Email" as the delivery method, and enter the "To" and "From" fields. The "Message" field contains the placeholder "Hope you enjoy this Amazon Gift Card!" with a character count of 463. The "Quantity" is set to 1, and the "Delivery Date" is set to "Now". At the top right, there are buttons for "Add to cart" (Qty: 1 gift card \$50.00), "Buy Now", and "Add to List".

# Decoy Effect

The Decoy Effect or the Asymmetric Dominance Effect is a cognitive bias in which consumers will tend to have a specific change in preferences between two options when also presented with a third option that is asymmetrically dominated.

		
<p><b>2.3GHz Dual-Core Processor with Turbo Boost up to 3.6GHz</b> <b>1TB Storage</b></p> <p>2.3GHz dual-core 7th-generation Intel Core i5 processor Turbo Boost up to 3.6GHz 8GB 2133MHz memory, configurable to 16GB 1TB hard drive<sup>1</sup> Intel Iris Plus Graphics 640 Two Thunderbolt 3 ports 1920-by-1080 sRGB display</p> <p><b>\$91.58/mo. for 12 mo.*</b> Learn how to pay monthly at 0% APR with Apple Card Monthly Installments or <b>\$1,099.00</b></p> <p><b>Apple Trade In</b> Get credit toward a new Mac when you trade in your eligible computer. Or recycle it for free.* Get started</p> <p><a href="#">Select</a> </p>	<p><b>3.6GHz Quad-Core Processor</b> <b>1TB Storage</b> <b>Retina 4K Display</b></p> <p>3.6GHz quad-core 8th-generation Intel Core i3 processor 8GB 2400MHz DDR4 memory, configurable up to 32GB 1TB hard drive<sup>1</sup> Radeon Pro 555X with 2GB of GDDR5 memory Two Thunderbolt 3 ports Retina 4K 4096-by-2304 P3 display</p> <p><b>\$108.25/mo. for 12 mo.*</b> Learn how to pay monthly at 0% APR with Apple Card Monthly Installments or <b>\$1,299.00</b></p> <p><b>Apple Trade In</b> Get credit toward a new Mac when you trade in your eligible computer. Or recycle it for free.* Get started</p> <p><a href="#">Select</a> </p>	<p><b>3.0GHz 6-Core Processor with Turbo Boost up to 4.1GHz</b> <b>1TB Storage</b> <b>Retina 4K Display</b></p> <p>3.0GHz 6-core 8th-generation Intel Core i5 processor Turbo Boost up to 4.1GHz 8GB 2666MHz DDR4 memory, configurable up to 32GB 1TB Fusion Drive<sup>1</sup> Radeon Pro 560X with 4GB of GDDR5 memory Two Thunderbolt 3 ports Retina 4K 4096-by-2304 P3 display</p> <p><b>\$124.91/mo. for 12 mo.*</b> Learn how to pay monthly at 0% APR with Apple Card Monthly Installments or <b>\$1,499.00</b></p> <p><b>Apple Trade In</b> Get credit toward a new Mac when you trade in your eligible computer. Or recycle it for free.* Get started</p> <p><a href="#">Select</a> </p>

**Similarity attraction effect:** This is the tendency for people to seek out others who are just like them. “Opposites attract” turns out to be a myth: we tend to like individuals who are like us.

Ex. Dr. Stanley's **Famous Uncle Effect** (*I made this up, but I do have a "famous" uncle, my dad's brother*): Research on hiring practices has found that employers prefer candidates who are similar to themselves in terms of hobbies and life experiences, even though these similarities aren't related to job performance.

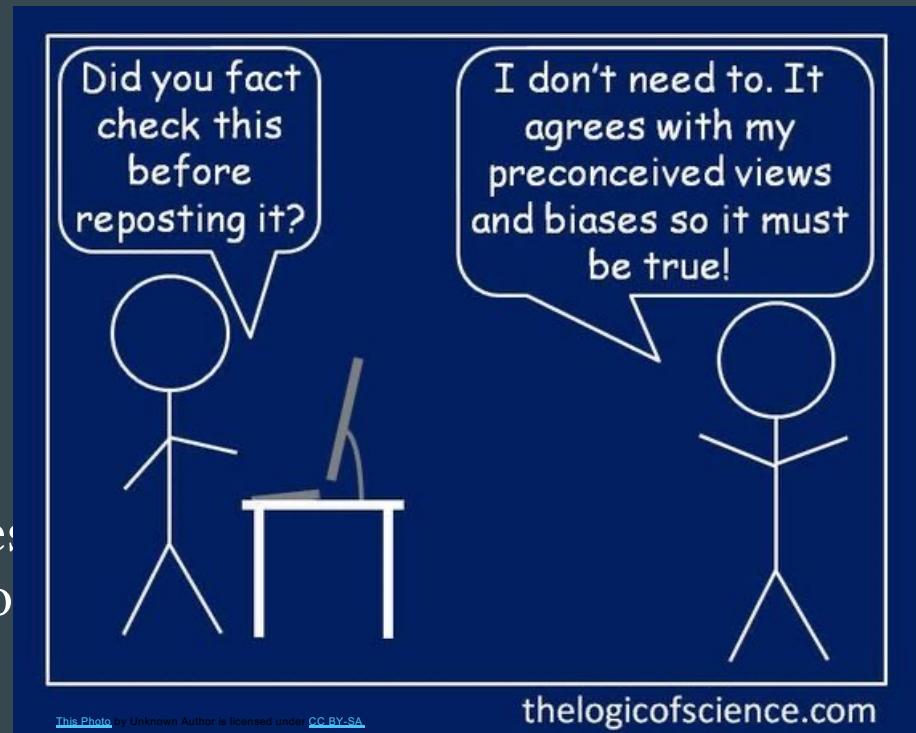


A screenshot of the Rolling Stone website. The headline reads "Ralph Stanley: His 10 Greatest Performances". The sub-headline says "From his signature 'O Deer' to a surprise Velvet Underground cover". Below the headline is a large photo of Ralph Stanley wearing a cowboy hat and a microphone. At the bottom of the page, there is a caption: "Ralph Stanley accepts the Grammy Award for Best Male Country Vocal Performance for his song 'O Deer' at the 48th Annual Grammy Awards in Los Angeles February 27, 2005. RUSTY PERIN/GETTY IMAGES FOR NARAS" and a small photo of him holding a Grammy award.



**Confirmation bias:** This bias occurs when people favor information that confirms their beliefs and ignore or discount disconfirming information.

Confirmation bias is one of the reasons why hiring managers ask different questions to different candidates during an interview. Because they tend to ask questions that confirm their unique beliefs about each candidate, this often results in comparing apples to oranges.



# Why confirmation bias matters in UX/UI/HCI?

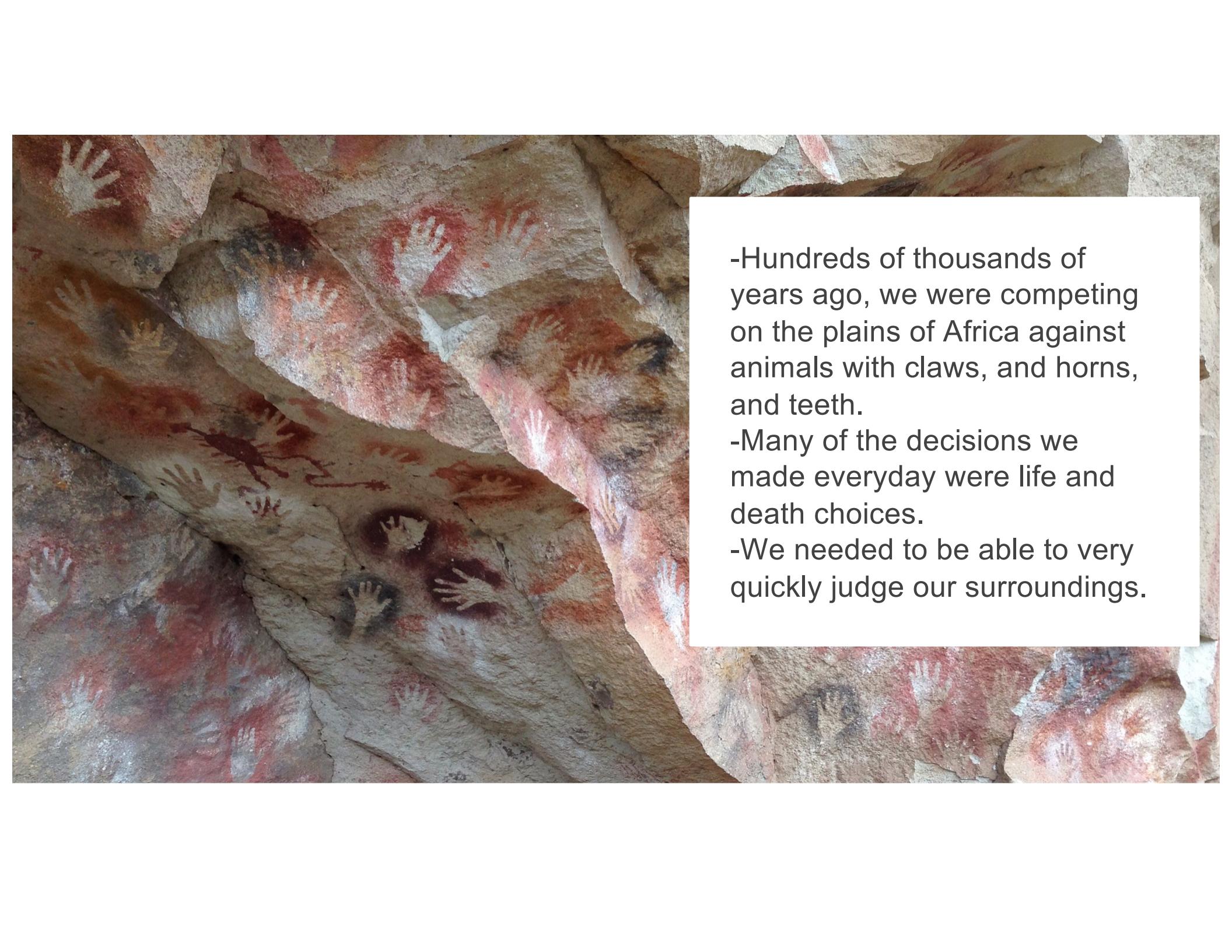


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# **Where does bias begin?**

**Maybe, just maybe, if we can understand the origins, we can correct our poor decisions?**

(spoiler alert: kind of wishful thinking, but at least we will have some awareness)



-Hundreds of thousands of years ago, we were competing on the plains of Africa against animals with claws, and horns, and teeth.

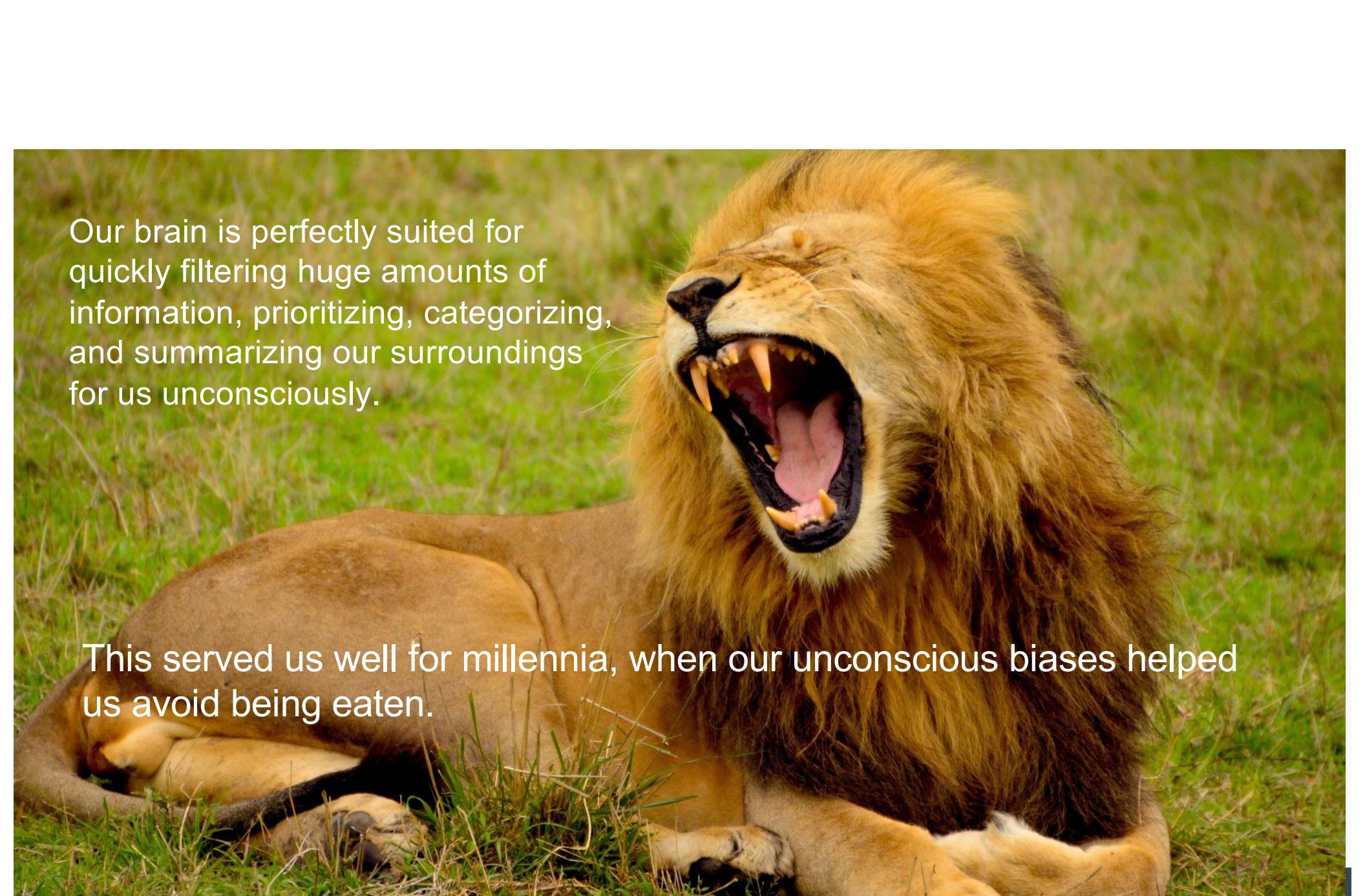
-Many of the decisions we made everyday were life and death choices.

-We needed to be able to very quickly judge our surroundings.

# Let's play out a little scenario.

Let's say one day one of our cave-dwelling ancestors decides they want to bust their biases. So they set out and walking across a forest clearing they spot a creature approaching. Now, instead of jumping to conclusions, they carefully consider - "Well, it's thick and has a short tail, so it's not a wolf. It's bigger than a coyote but smaller than a moose. It's black, got long claws, and can stand on its hind legs. I'm going to conclude that this animal is probably a bear and I should probably run."

ancestors bias-free day ☺



Our brain is perfectly suited for quickly filtering huge amounts of information, prioritizing, categorizing, and summarizing our surroundings for us unconsciously.

This served us well for millennia, when our unconscious biases helped us avoid being eaten.

# **“You have no free will about what you’re doing right now...”**

- Our brains adapted to keep us safe. Thousands of years ago, humans needed to contextualize situations to avoid danger—like being attacked by panthers.
- We may not realize it, our actions are merely reflexes based upon our past experiences.
- “You have no free will about what you’re doing right now...everything is a reflex, grounded in assumptions. It comes from your personal and evolutionary history.”

Our ingrained reflexes make us just like this frog:

**These reflexes keep us alive, but they also become barriers to seeing differently.**



<https://youtu.be/WIEzvdIYRes>



# Creativity is dangerous...

Studies show - while most people say they feel positively toward creativity, when asked to judge the desirability of various ideas, they overwhelmingly reveal an implicit bias toward the practical over the novel.

**Biologically speaking, creativity is dangerous.**

We rely on preconceived notions to keep us safe. To be creative is to go against thousands of years' of assumptions.

**People by nature are highly influenced** by the opinions and behaviors of others, and conformity occurs when we change the way we think or act to imitate others.

Regardless of how open-minded people are in general, **they still seek to reduce uncertainty in their lives.** Most people prefer what is safe and conventional and may unconsciously shy away from creative ideas because they are new, novel, and potentially uncomfortable.

**Bias is not overt**, we're typically unable to recognize it in ourselves.

**People by nature are highly influenced** by the opinions and behaviors of others, and conformity occurs when we change the way we think or act (dress) to imitate others.

