



# Is Drinking this Risky?





Epistemic Uncertainty (Known unknown)

There's a definite answer to what the risk is, and we could discover this with more knowledge.



Ontological Uncertainty (Unknown unknown)

We don't know what questions we should be asking to find out whether there is a risk or not



Statistical Uncertainty (Know range of possibilities)

We know the probability of something bad happening, but we cannot predict what will actually happen.











#### Outcome



What could happen if you are exposed to a given amount of a harmful substance?





Major impairment

What could happen if you are exposed to a given amount of a harmful substance?

Chronic impairment







Major impairment

What could happen if you are exposed to a given amount of a harmful substance?

Death

but where on the curve a given person lies is often not

Severity

Chronic impairment

Perceptual Uncertainty (What we think we know)

What we think and feel the risk is may not align with what the actual risk is





PURIFIED WATER ENHANCED WITH MINERALS FOR A PURE, FRESH TASTE







bleach Cleans Deodorizes NET 182 FL OZ (1.42 GAL) 5.38 L



### Heuristics (Mental Shortcuts)



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For example:

#### Anchoring

Relying more heavily on the first information you get

#### Availability

Relying on what easily comes to mind

#### Familiarity

Sticking with what you know

#### Affect

Relying on feelings and emotions



### **Cognitive Biases**



## **Cognitive Biases**

#### For example:

#### Framing

Responding to how information is presented

### Motivated Reasoning

Justifying existing opinions and beliefs

#### Confirmation

Using information to support what you "know" is correct

#### Belief

Testing new information against what you believe to be true





... if it had just been poured from a sealed bottle of Dasani?



... if there were news reports of possible contamination at one Dasani bottling plant?



... if came from a faucet somewhere in the area of Flint, Michigan?



... if the person handing it to you had diarrhea?



# Precautionary Principle



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(Better safe than sorry)

When human activities may lead to morally unacceptable harm that is scientifically plausible but uncertain, actions shall be taken to avoid or diminish that harm.

http://www.precautionaryprinciple.eu/





Scenario: Water from a bottle containing BPA.

FDA says BPA in bottles is safe.

Tests show levels in water are acceptably safe.

New research indicates some exposures might harm fetal development, but are inconclusive.



# Risk and Values

What we consider "risky" or not depends many things, including:

- Evidence
- Assumptions
- Individual and social psychology
- Ethics
- Values
- What's important to us



# Risk and Values

In many cases, risk is less about the science, and more about what is personally and socially acceptable

In this sense, risk is a "social construct"



# Risk and Values

But remember, both the ability of something to cause harm, and the type of harm it causes, are often independent of how we perceive the risk, and what we think about it



## What if we ...



## What if we ...

glass of water with self-driving cars?





### ARIZONA STATE UNIVERSITY RELATE UNIVERSITY RESTORMED

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