

# RISK COMMUNICATION

*Is it Safe?*

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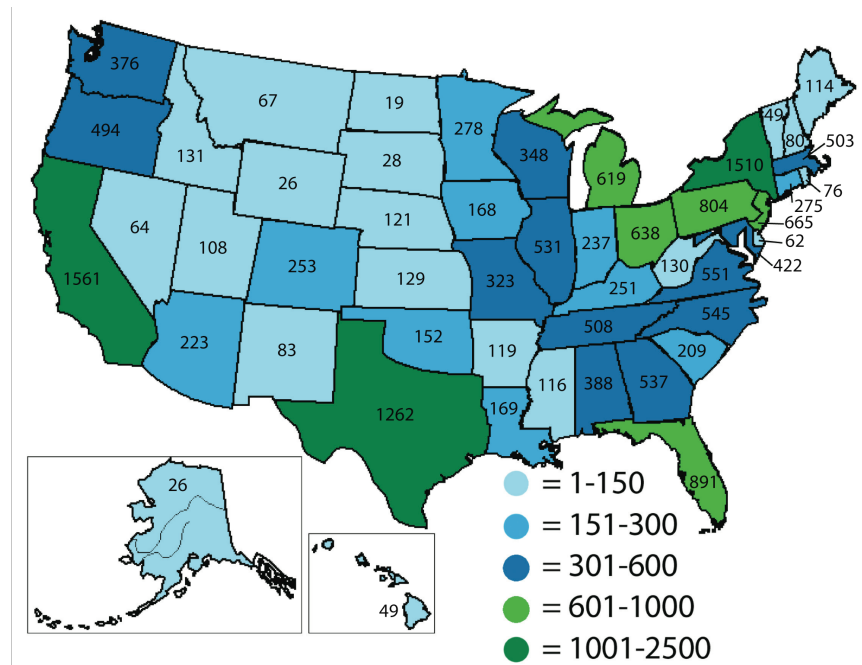
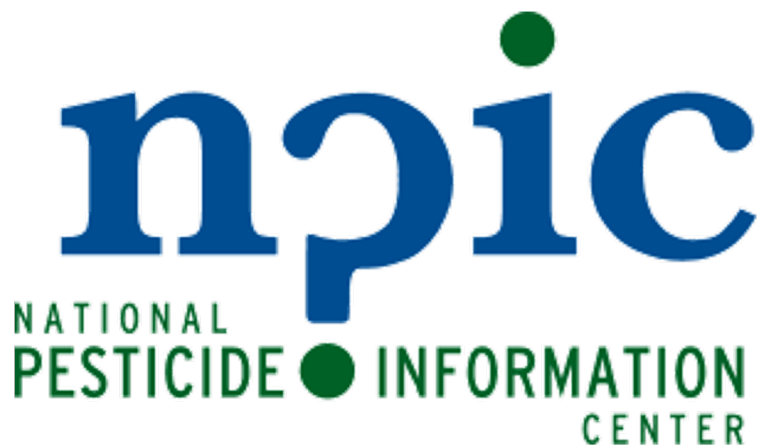
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# Disinfectant Safety Tips for Workers

What are pests?	What are pesticides?	Local Contacts
<p>Pests are destructive or nuisance organisms (insects, weeds, bacteria, wildlife) that affect crops, food, livestock, health, etc.</p> <p><a href="#">How to Identify Your Pest</a> <a href="#">Pest-specific Information (by name)</a> <a href="#">Before You Control Your Pest</a> <a href="#">Pest Control Tips</a> <a href="#">Integrated Pest Management</a></p>	<p>According to the law, a pesticide is any substance "intended for preventing, destroying, repelling, or mitigating any pest."</p> <p><a href="#">Herbicides</a> <a href="#">Disinfectants</a> <a href="#">Fungicides</a> <a href="#">Insecticides</a> <a href="#">Natural and Biological Pesticides</a> <a href="#">Repellents</a> <a href="#">Rodenticides</a> <a href="#">Other types of pesticides</a></p>	 <p>Find local pesticide &amp; pest control information</p> <p>Enter your zip code here...</p>



Science-based information about pesticides

Toll-free phone service available:

11:00 – 3:00 Eastern; 8:00 – 12:00 Pacific

Funded through a cooperative agreement with EPA



One-on-One



Website



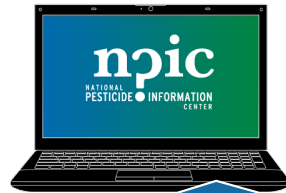
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# Risk Perception

- Most risk perception is determined by *fast* intuitive feelings.
- Understanding risk perception is critical for effective communication.



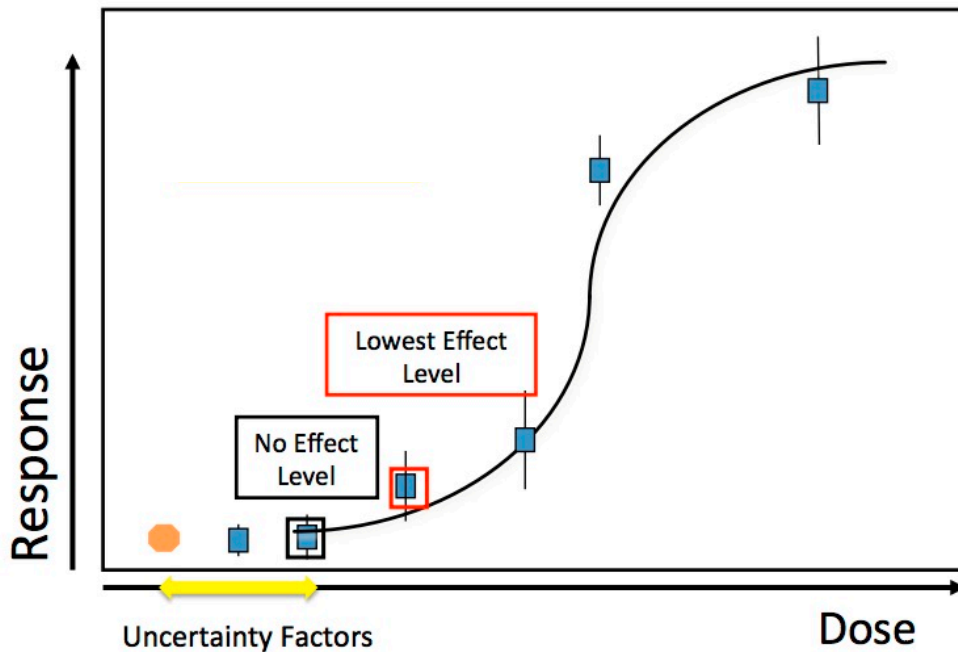
## RISK PERCEPTION IT'S PERSONAL

In the face of contradictory information, people must rely on their instincts as much as the facts to size up potential threats. © Corbis

- Risk does not exist “out there,” independent of our minds and cultures, waiting to be measured.
- Human beings invented the concept risk to help them understand the uncertainties of life.
- Many communities perceive risks differently.
- Trauma can inform our risk-perception (internal calculations)



When professionals say “risk,”  
we’re thinking of “probability.”



Risk is measured at the population level.  
-Percent of population impacted-

When others hear “risk”  
they may think “danger.”



Risk is understood at the  
individual level. (Will it hurt  
me or not?)



## Safety

Yes or No

No precautions necessary

Safe is safe for everyone

Easy to explain

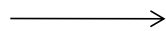
## Risk

More risky-----Less risky

Precautions reduce risk

Risk is higher for certain people

Harder to explain



The word “safe” is unsafe.

**You said it was safe!**



**You filled your swimming pool with what now?**



# Re-frame the “safe” question

Is it safe?

The risk is low, but tell me about your specific concerns...



Listen

Quickly explain why “safe” isn’t the right word or mindset

Discuss risk level and things that affect it

$$\mathbf{Risk} = \mathbf{Toxicity} \times \mathbf{Exposure}$$



- Toxicology of active ingredient
- Product signal word
- Dose estimate
- Effects (signs, symptoms) reported in the literature
- Onset, duration and resolution of symptoms

- Distance to application site
- Route of potential exposure
- Physical/chemical properties of active ingredient
- Duration/frequency of exposure
- Bioavailability by the route in question

### TOXICITY CLASSIFICATION - GLYPHOSATE

	High Toxicity	Moderate Toxicity	Low Toxicity	Very Low Toxicity
<b>Acute Oral LD<sub>50</sub></b>	Up to and including 50 mg/kg (≤ 50 mg/kg)	Greater than 50 through 500 mg/kg (>50-500 mg/kg)	<b>Greater than 500 through 5000 mg/kg (&gt;500-5000 mg/kg)</b>	Greater than 5000 mg/kg (>5000 mg/kg)
<b>Inhalation LC<sub>50</sub></b>	Up to and including 0.05 mg/L (≤0.05 mg/L)	Greater than 0.05 through 0.5 mg/L (>0.05-0.5 mg/L)	<b>Greater than 0.5 through 2.0 mg/L (&gt;0.5-2.0 mg/L)</b>	Greater than 2.0 mg/L (>2.0 mg/L)
<b>Dermal LD<sub>50</sub></b>	Up to and including 200 mg/kg (≤200 mg/kg)	Greater than 200 through 2000 mg/kg (>200-2000 mg/kg)	<b>Greater than 2000 through 5000 mg/kg (&gt;2000-5000 mg/kg)</b>	Greater than 5000 mg/kg (>5000 mg/kg)
<b>Primary Eye Irritation</b>	Corrosive (irreversible destruction of ocular tissue) or corneal involvement or irritation persisting for more than 21 days	Corneal involvement or other eye irritation clearing in 8 - 21 days	<b>Corneal involvement or other eye irritation clearing in 7 days or less</b>	Minimal effects clearing in less than 24 hours
<b>Primary Skin Irritation</b>	Corrosive (tissue destruction into the dermis and/or scarring)	Severe irritation at 72 hours (severe erythema or edema)	Moderate irritation at 72 hours (moderate erythema)	<b>Mild or slight irritation at 72 hours (no irritation or erythema)</b>

**The highlighted boxes reflect the values in the "Acute Toxicity" section of this fact sheet.** Modeled after the U.S. Environmental Protection Agency, Office of Pesticide Programs, Label Review Manual, Chapter 7: Precautionary Labeling. <http://www.epa.gov/oppfead1/labeling/lrm/chap-07.pdf>



*There is no acceptable **risk**  
in the absence of **benefit.***

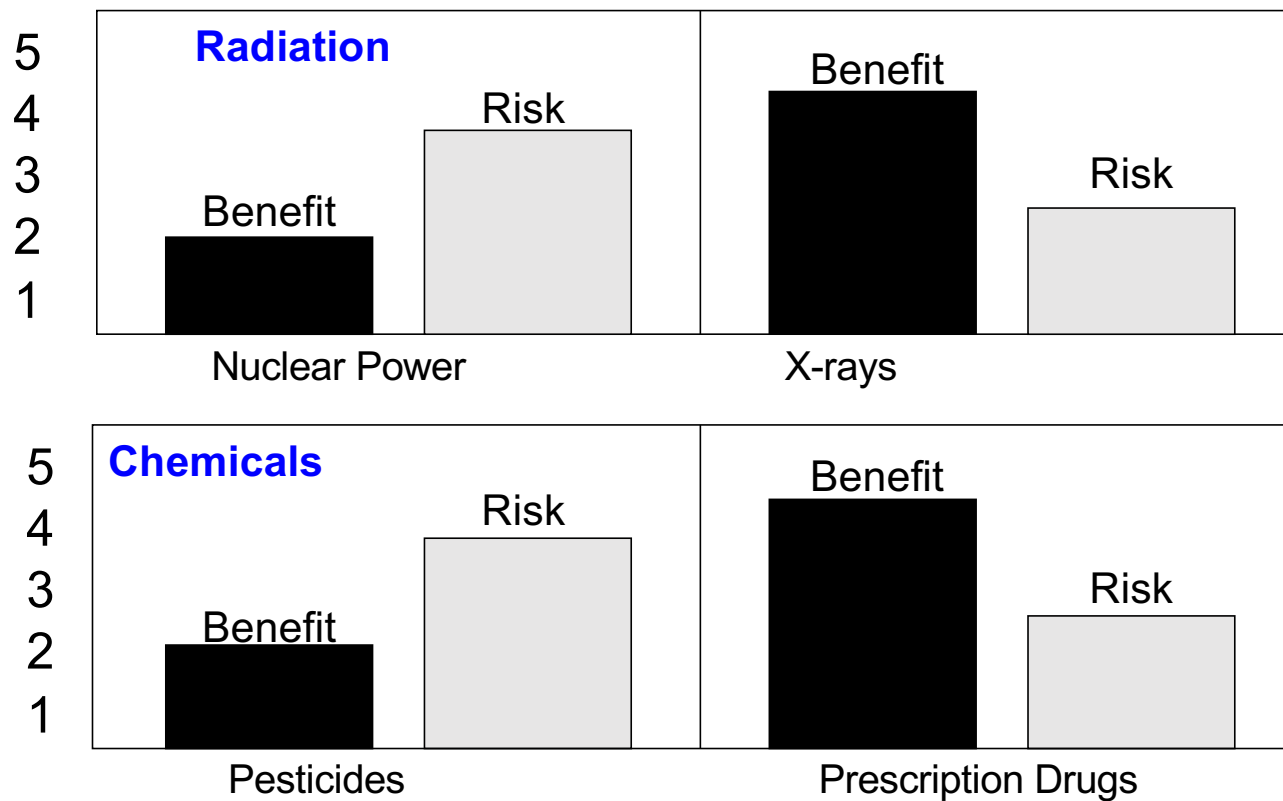


Figure 3. Mean perceived risk and perceived benefit for medical and nonmedical sources of exposure to radiation and chemicals. Each item was rated on a scale of perceived risk ranging from 1 (very low risk) to 7 (very high risk) and a scale of perceived benefit ranging from 1 (very low benefit) to 7 (very high benefit). Note that *medical sources of exposure have more favorable benefit/risk ratings* than do the nonmedical sources. Data are from a national survey in Canada by Slovic et al., 1991.

Risks are less likely to be acceptable if the benefits are hidden from view, or if they are not fairly distributed among those who bear the risks.



## **Benefits of Pesticides**



# Risk denial increases with perceived control

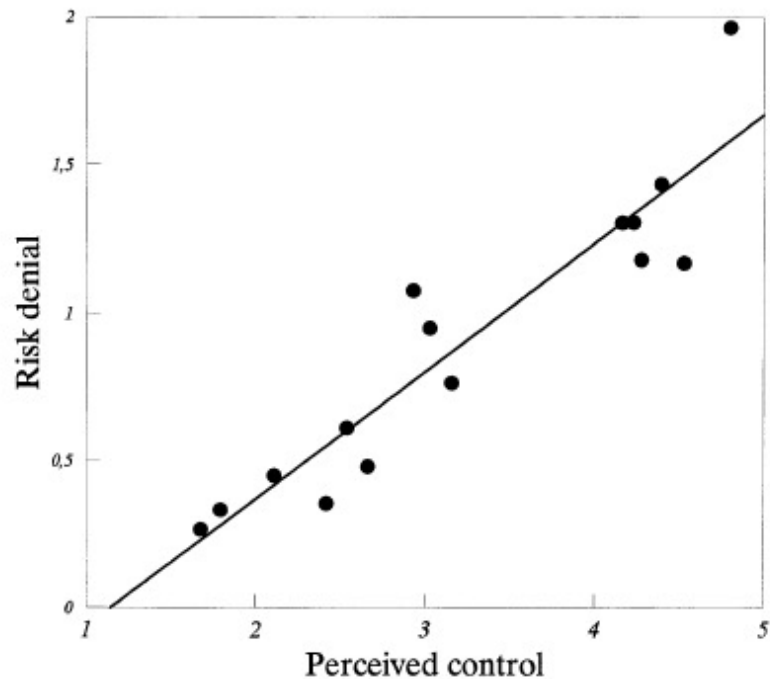


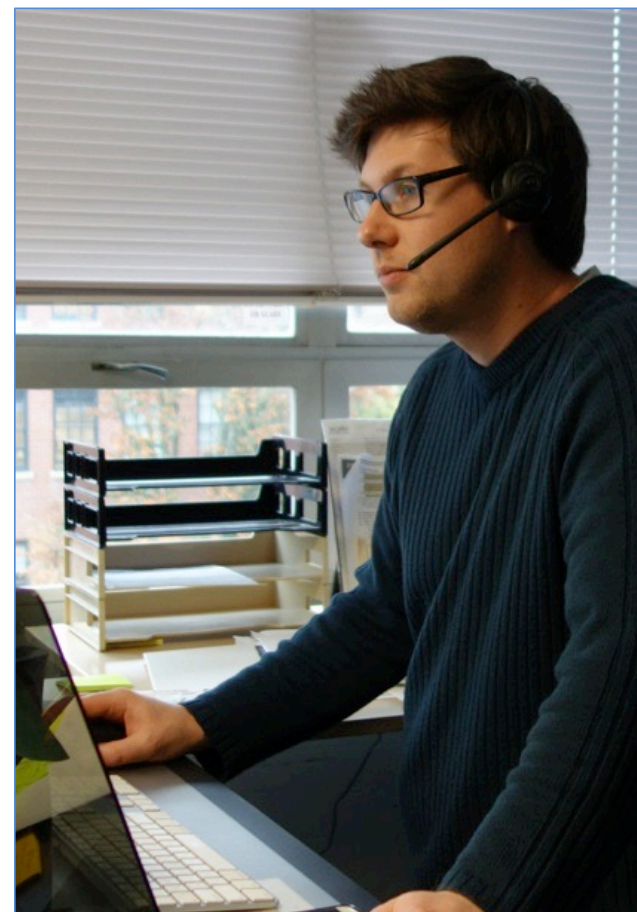
Fig. 2. Risk denial (general minus personal risk) plotted against perceived control over risks. Each point corresponds to one hazard; mean ratings are plotted.



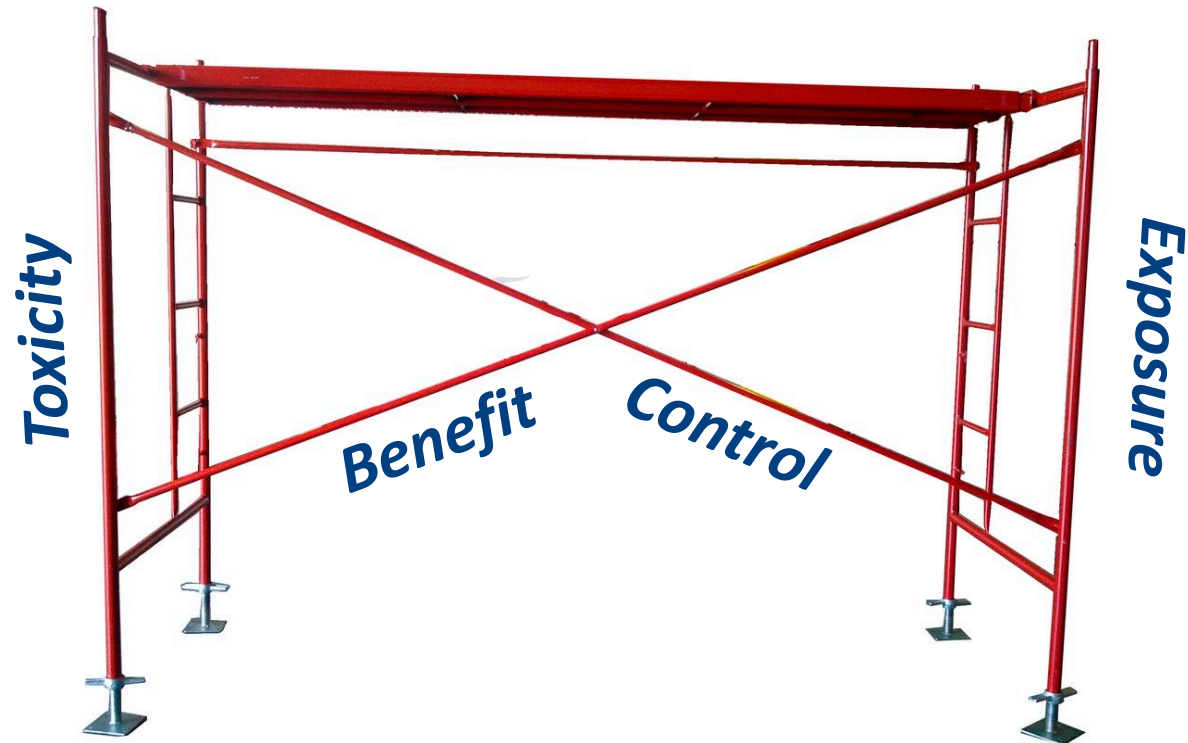
# Ways to Minimize Exposure

## Liquid pesticide applied to a residential yard:

- Read, understand and follow all label instructions.
- Avoid contact with the pesticide when the product is wet.
- Avoid area during application, especially downwind from application.
- Apply at low pressure to avoid generating pesticide "mist."
- Be aware that wet or shaded areas may not dry as fast as sunny locations.
- Keep people and pets off treated area for amount of time specified on label, or until dry if not specified.
- If you have to walk on the treated area, remove shoes before going inside to minimize 'tracked-in' residue on floors.
- Do not apply on windy days. This will minimize the potential for drift and improve efficacy.
- Apply only in areas where there is an active pest problem.
- Read, understand and follow all label instructions.
- Remove any items that may accidentally come in contact with the product (toys, swings, plants).
- Immediately following application, wash hands, face and clothing.
- Using appropriate PPE (following label directions), wipe up any puddles of product.
- If you have a well, follow product directions for maximum proximity of the application to the well-head and use products with low soil-mobility.
- Avoid any direct skin contact with treated areas, even after product dries.
- Use only pesticides labeled for use in outdoor residential lawns.
- Use caution mowing, edging and trimming afterwards; some pesticide residues may be irritating even after they have dried if the mower "kicks up" grass/dust containing pesticide.
- Always store pesticide products in such a manner that children will not have access.



# *Informed Risk Decision-Making*



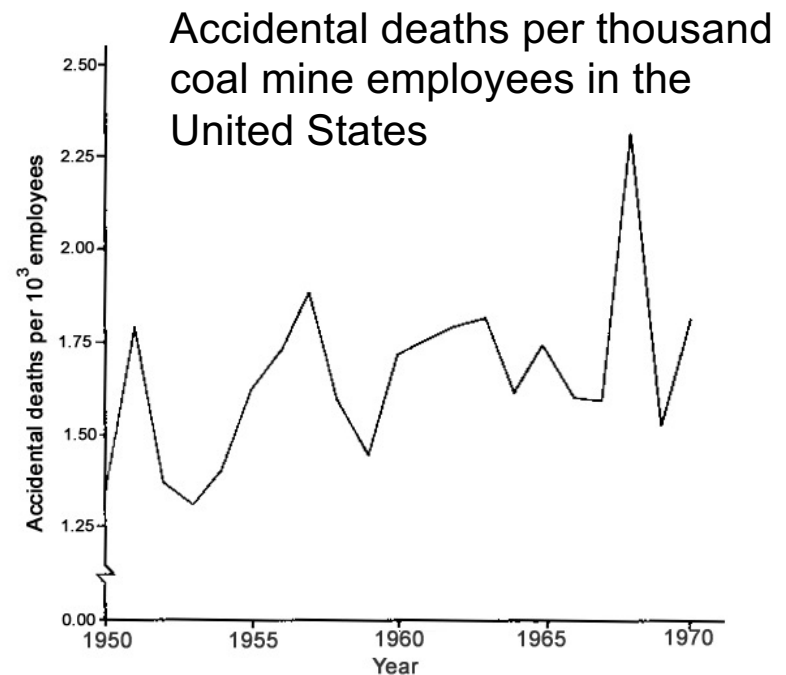
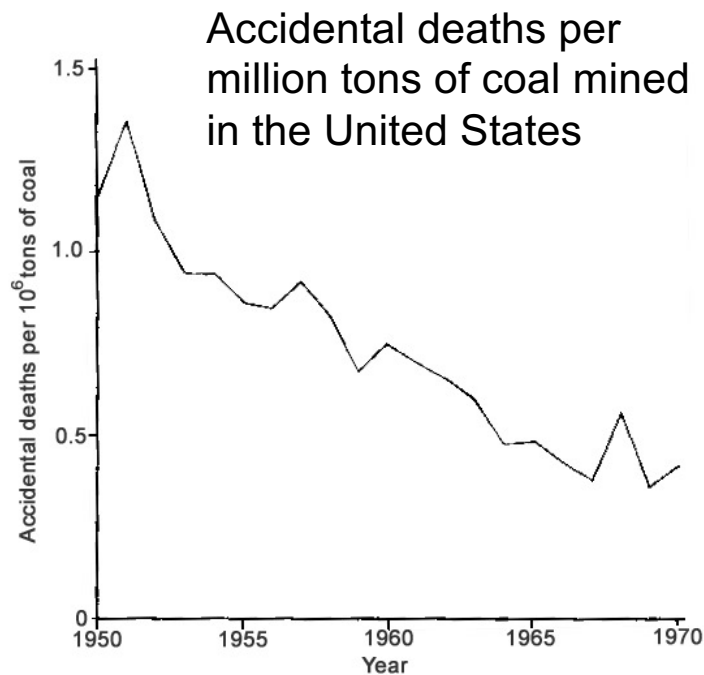
## Psychology of Risk: Key Points

- Trust is critical: hard won, easily lost
- Risk and risk assessment are subjective and value-laden
- If you define risk one way, the best solution might be (this).  
If you define it another way, the best solution might be (that).

**Defining risk is an exercise of power.**

# How is Risk Defined? Who Decides?

Is coal mining getting safer?



Counting *fatalities* gives equal weight to:

- Young and old
- Painful and painless deaths
- Voluntary and involuntary exposure(s)
- Fair (beneficial) and unfair (no benefit)



# The “Deficit Model” is a Trap.



Here, have another fact sheet, video...



They don't get it. I can't help it if people don't understand science...

In reality, everyone has knowledge to share.



Conceptual model of environmental health literacy adapted from Bloom (1956), representing the potential for different levels of EHL across various environmental health science topics.

Level of EHL/EHS Topic	Breast Cancer	Autism	Asthma	Environ. Justice	Pesticide Exposure	Nano-material	Lead in Water
Create							
Evaluate							
Analyze							
Apply							
Understand							
Recognize							

## The Emergence of Environmental Health Literacy—From Its Roots to Its Future Potential

Symma Finn and Liam O'Fallon

Published: 1 April 2017 | <https://doi.org/10.1289/ehp.1409337> | Cited by: 15

# Gut feelings

- Feelings about **outcomes** and feelings about **probabilities** are often confused.
- When strong emotions are involved, there is 'probability neglect.'

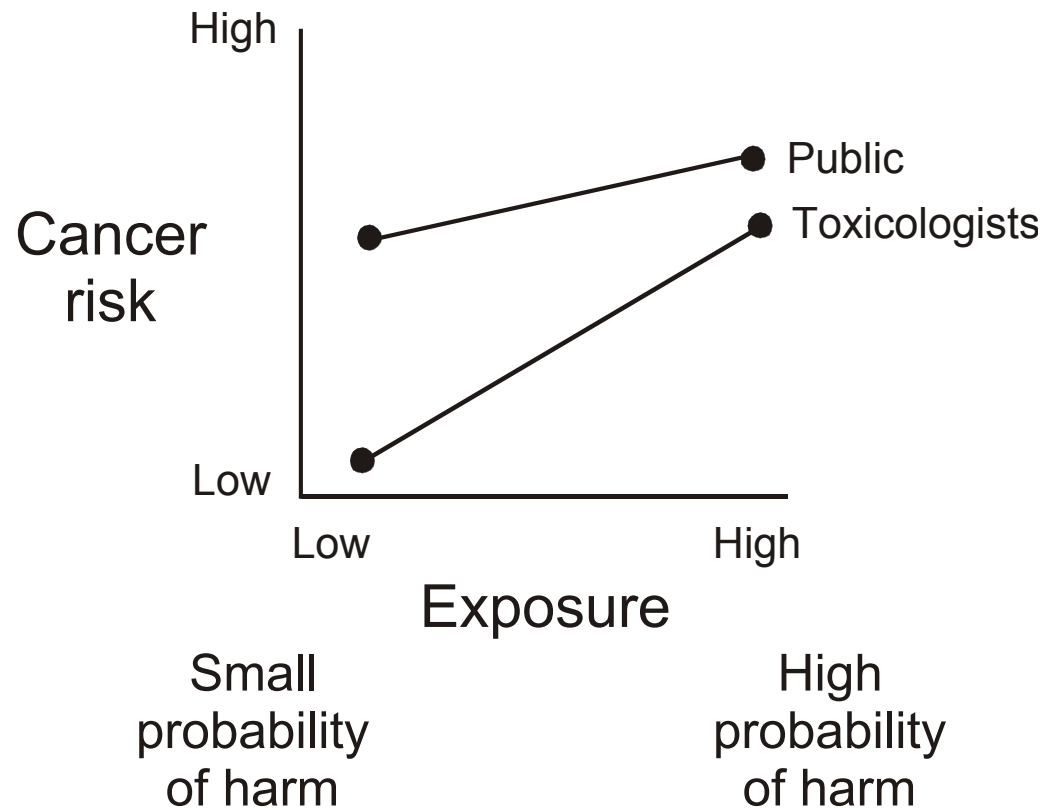


People are prone to . . . probability neglect, especially when their **emotions are intensely engaged**. When probability neglect is at work, people's attention is focused on the bad outcome itself, and they are inattentive to the fact that it is unlikely to occur.

Cass R. Sunstein

*The Journal of Risk and Uncertainty*, 26(2/3); 2003

Many people lack dose-response sensitivity for exposure to chemicals that can produce **dreaded effects**, such as cancer.



If large exposures are bad, small exposures are also bad.

In this study, people with different worldviews were asked about their attitudes towards nanotechnology, before and after being given information about nanotechnology.

# Some questions that measure worldviews (agree?)

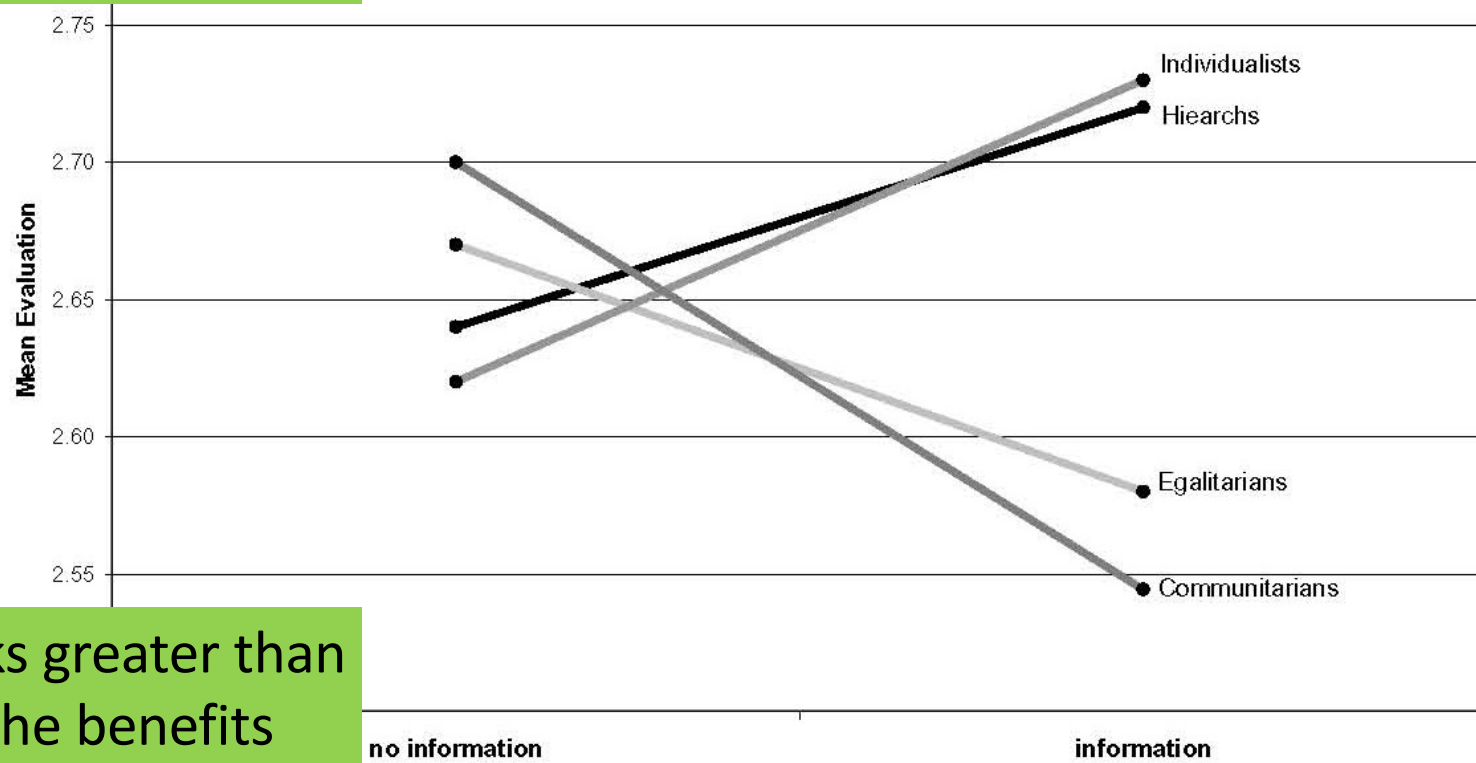
The government should stop telling people how to live their lives  
(Individualism)

The government should do more to advance society's goals, even if  
that limits the freedom of individuals (Communitarian)

Our society would be better off if the distribution of wealth was  
more equal (Egalitarianism)

We should let the experts make all the risk decisions for society  
(Hierarchism)

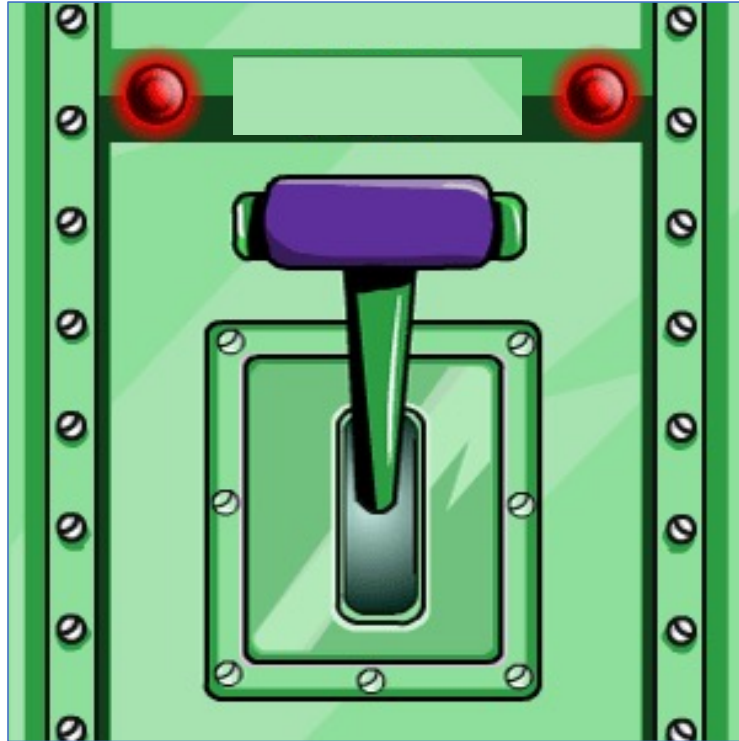
Benefits greater than the risks



Risks greater than the benefits

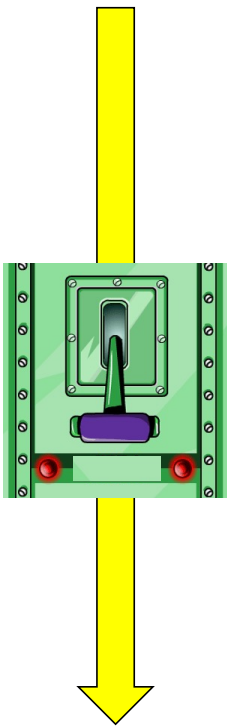
Figure 4. Impact of Information Across Condition by Dimension of Cultural Worldview

Increase perceived **benefit** and/or **control**...



Decrease perceived **risk**.





Lower risk  
perceived

In person's control ----- Out of person's control

Voluntary ----- Imposed

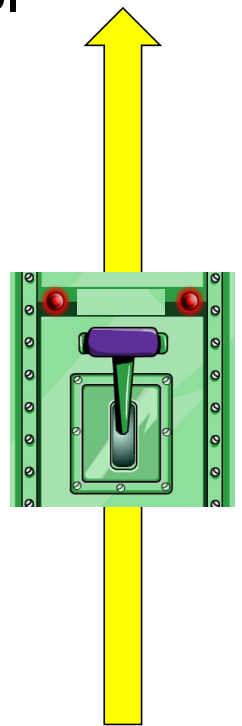
Beneficial ----- Not beneficial

Natural ----- Man-made

Affects only adults ----- Affects children

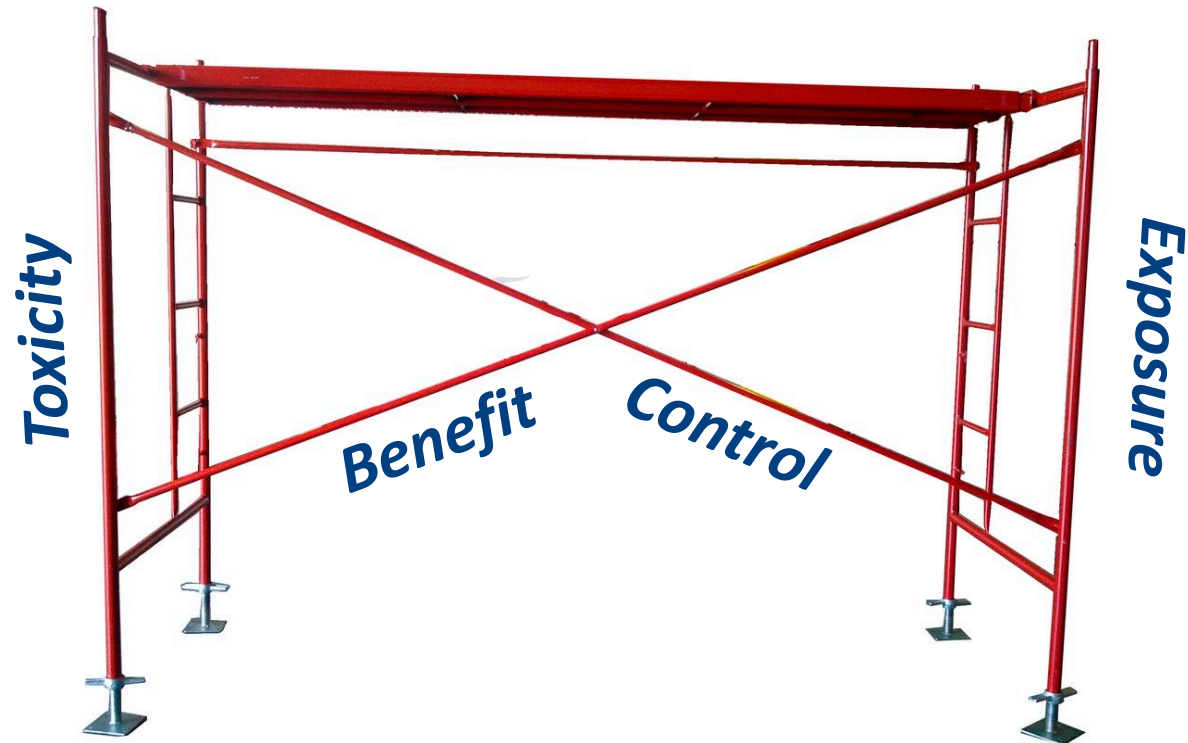
Familiar ----- Exotic

Trusted entity ----- Untrusted entity



Higher risk  
perceived

# *Informed Risk Decision-Making*





## A Proposed Checklist:

Frame as risk rather than safety: \_\_\_\_\_

Provide hazard/toxicity information: \_\_\_\_\_

Provide exposure information: \_\_\_\_\_

Benefit(s) of the activity/thing: \_\_\_\_\_

Action items in person's control: \_\_\_\_\_

Where to get more information: \_\_\_\_\_

# the **DEBUNKING** handbook

It's not just  
*what* people  
think that  
matters, but  
*how* they  
think.



# the **DEBUNKING** handbook

## The overkill backfire effect

**MYTH**  
FACT FACT FACT  
FACT FACT FACT  
FACT FACT FACT  
FACT FACT FACT



**MYTH**  
FACT  
FACT  
FACT



# the **DEBUNKING** handbook

## The overkill backfire effect

**MYTH**  
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**MYTH**  
FACT  
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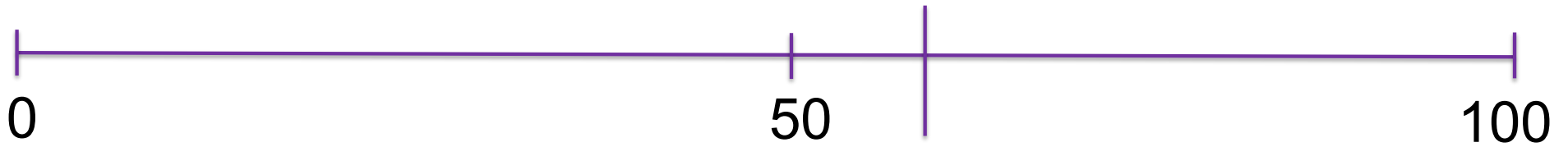




# Finding the Sweet Spot

Threat/danger

Reward/benefit



- Norepinephrine -  
on alert

~60

- Dopamine -  
relaxed

If the focus is too much on 'threat',  
the brain (learning) shuts down.

## In summary, **some suggestions:**

- Chemical risk assessment measures the probability of harm by comparing dose levels.
- Personal risk ~~assessment~~ perception varies with world-view, strength of emotion, and perceived benefit.
- Probability of harm doesn't matter if emotions are strong.
  - **Address emotions first. Then people may consider *probability* in their personal risk ~~assessment~~ perception.**

## In summary, **some suggestions:**

- Benefit(s) often inform risk perception more than the probability of harm.
  - Defining risk is an act of power.
  - 'Safe' is not a safe word.
- 
- **Don't be silent about benefits when discussing risk.**
  - **Don't define risk for people. They may feel dominated.**
  - **Discuss risk, and ways to reduce it. Empower people.**



## A Proposed Checklist:

Frame as risk rather than safety: \_\_\_\_\_

Provide hazard/toxicity information: \_\_\_\_\_

Provide exposure information: \_\_\_\_\_

Benefit(s) of the activity/thing: \_\_\_\_\_

Action items in person's control: \_\_\_\_\_

Where to get more information: \_\_\_\_\_

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