

**DISTRACT,
DISMISS, DELAY:
HOW INDUSTRIES AND
ORGANIZATIONS
MANUFACTURE DOUBT,
TO THE DETRIMENT OF
ENVIRONMENTAL
HEALTH**

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MANUFACTURED DOUBT

“... actions that deliberately alter and misrepresent knowable facts and empirical evidence to promote an agenda, often to benefit a broader industry, specific corporation, or group of individuals.”

Goldberg & Vandenberg

INDUSTRY: LEARNING LESSONS FROM TOBACCO



STARTING IN THE 1950S

Case control studies show that smokers have significantly higher rates of cancer.

1954, Hammond & Horn: smokers have 52% more deaths. The heavier the smoker, the heavier the consequences.

SURGEON GENERAL LUTHER TERRY (1964):

"The strongest relationship between cigarette smoking and health is in the field of lung cancer."

"There is a very strong relationship, and probably a causal relationship, between heart disease and cigarette smoking..."

TOBACCO COMPANY EXECUTIVE:

"Doubt is our product since it is the best means of competing with the 'body of fact' that exists in the minds of the general public. It is also the means of establishing a controversy."

INCENTIVES TO MANUFACTURE DOUBT



*In 2010, the combined profits of the six leading tobacco companies was U.S. \$35.1 billion, equal to the combined profits of Coca-Cola, Microsoft, and McDonald's in the same year.

* If Big Tobacco were a country, it would have a gross domestic product (GDP) of countries like Poland, Saudi Arabia, Sweden and Venezuela.

*In 2010, tobacco industry's profit was equivalent to US\$6,000 for each death (global) caused by tobacco.

OUR APPROACH: MANUFACTURED DOUBT IN FIVE DISTINCT INDUSTRIES



Tobacco

Coal

Sugar

Atrazine

Climate
Change

STEP 1: LET'S START BY TELLING THESE STORIES (AGAIN)

Goldberg & Vandenberg, Reviews on Environmental Health 2019

TOBACCO: DIFFICULTY SHOWING CAUSAL RELATIONSHIPS

- What was the mechanism by which tobacco smoke causes cancer?
- Were there other (confounding) factors that could explain the relationship between smoking and cancer?
- Was there a genetic factor that increased cancer risk and the propensity to smoke?
- Is it plausible that one thing (smoking) could cause so many different health problems?

COAL AND BLACK LUNG

“...exploited the legal system to shift the burden of proof to its employees, who are not scientifically or financially equipped to demonstrate the necessary proof of a connection between their employment and disease.”

SUGAR & HEART DISEASE

“... the industry was able to strongly and somewhat reasonably shift blame away from itself onto another feature of food, high fat content, with plausible cause. Its actions had huge impacts on national diets in the United States and eventually changed the food industry forever.”

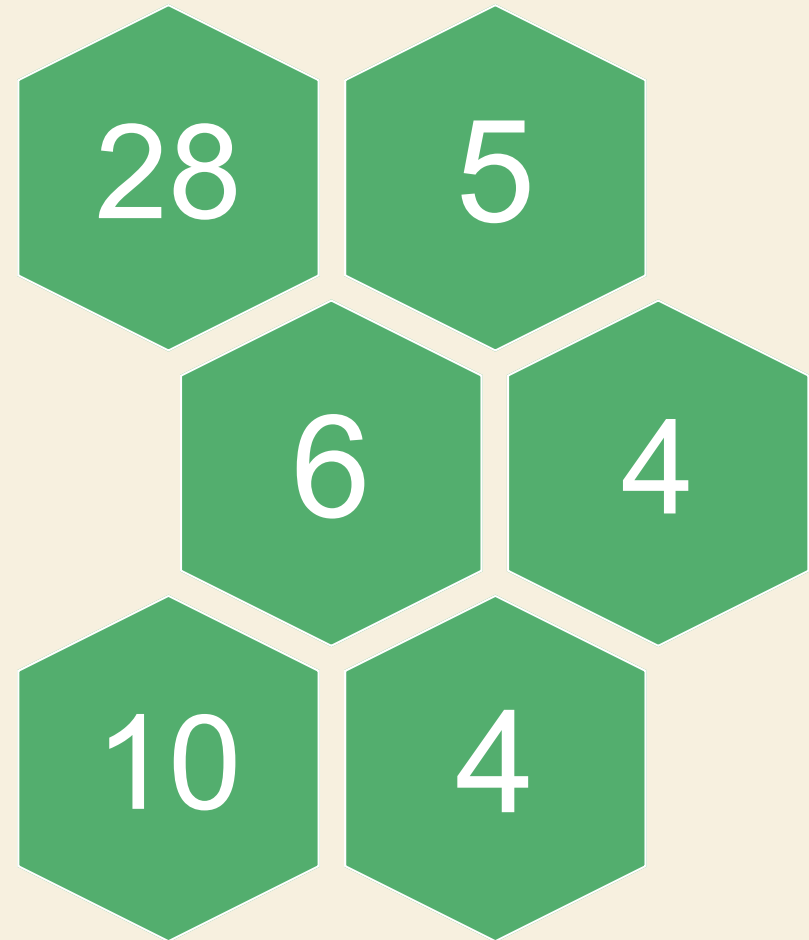
ATRAZINE, FROGS, AND TYRONE HAYES

“As the evidence for hazard piled against atrazine, Syngenta devised a host of methods to defend its product by covertly attacking Hayes, its most vocal opponent... It was not until a class action suit against Syngenta by an Illinois public water district that legal exhibits, including memos, reports, and journals kept by Syngenta employees and associates, that the plans to discredit Hayes became known.”

THE COLD WAR CONVERGES WITH CLIMATE CHANGE

“... As the war waned, and their role diminished, the three [Cold War experts] decided to maintain the Institute’s existence but shift its focus to environmental issues, an area where they could have influence with decision-makers and continue to be personally enriched... Using its proximity to the White House, the Institute advised against the existence of climate change, or at least the anthropogenic factor.”

**STEP 2:
IDENTIFY AS
MANY
DISTINCT
TACTICS AS
POSSIBLE TO
MANUFACTURE
DOUBT**

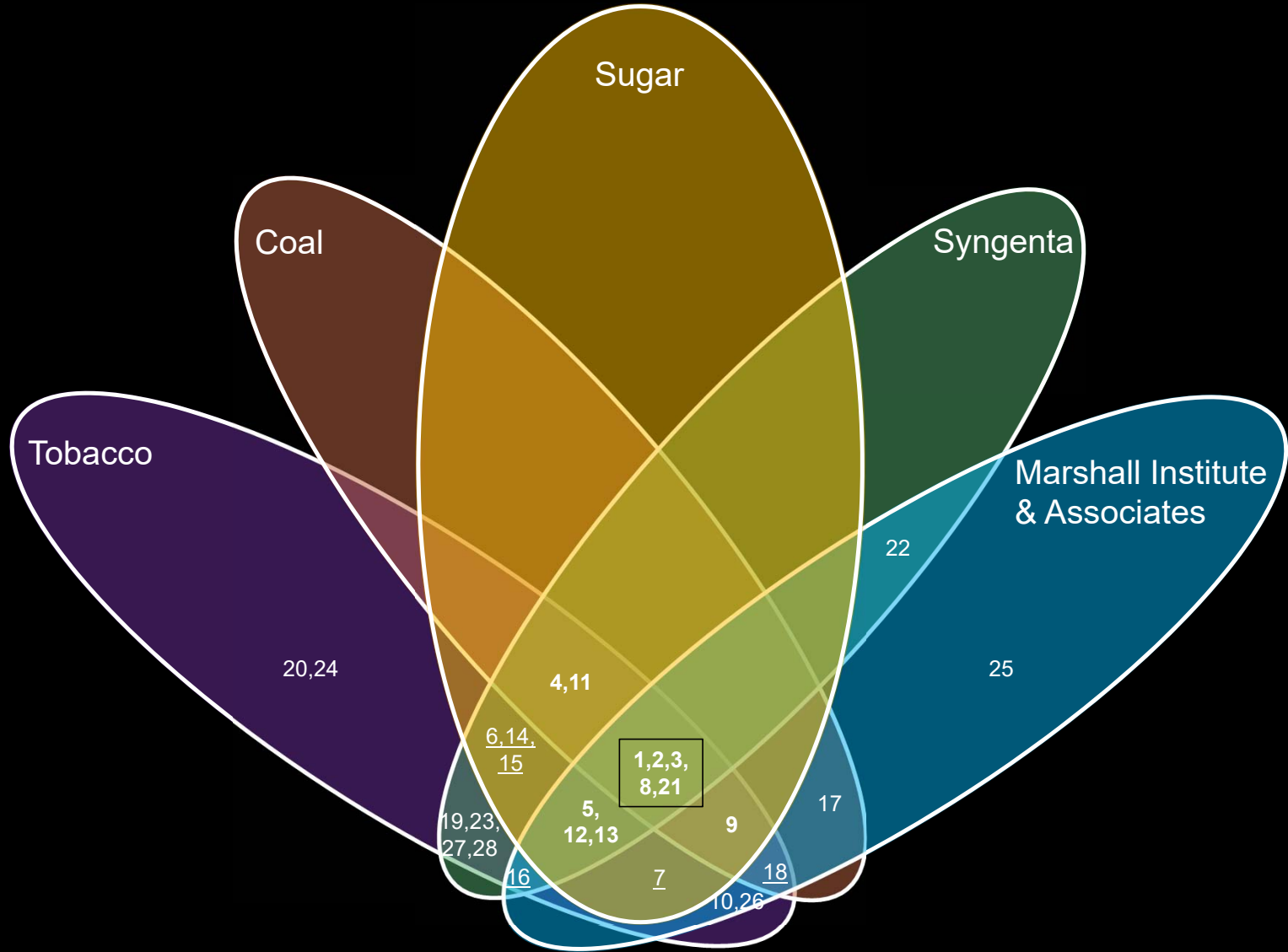


Goldberg & Vandenberg, Submitted

TACTICS

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- Attack study design
- Gain support from reputable individuals
- Misrepresent data
- Suppress incriminating information
- Contribute misleading literature
- Host conferences/seminars
- Avoid/Abuse peer review
- Employ hyperbolic language
- Blame other causes
- Invoke liberties/censorship/overregulation
- Define how to measure outcome/exposure
- Take advantage of scientific illiteracy
- Pose as defenders of health/truth
- Obscure involvement
- Develop a PR strategy
- Appeal to mass media
- Take advantage of a victim's lack of money/influence
- Normalization
- Impede government regulation
- Alter product to seem healthier
- Influence government/laws
- Attack opponents
- Appeal to emotion
- Inappropriately question causality
- Make strawman arguments
- Abuse credentials
- Abuse data access requests
- Make slippery slope arguments



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ESSENTIAL

Tactic	Explanation
Attack study design	Emphasize study design flaws that have only minimal effects on outcomes. Flaws include issues related to bias, confounding, or sample size
Gain Support from reputable individuals	Recruit experts or influential people in certain fields (politicians, industry, journals, doctors, scientists, health officials) to defend the product to gain broader support
Misrepresent data	Cherry-pick data, design studies to fail, or conduct meta-analyses to dilute the work of research(ers) demonstrating harm.
Employ hyperbolic language	Discuss scientific findings in absolutist terms or with hyperbole, use buzzwords to differentiate between “strong” and “poor” science (i.e. sound science, junk science, etc.)
Influence government / laws	Gain inappropriate proximity to regulatory bodies and encourage policy that is pro-product/industry

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EFFECTIVE



Suppress
incriminating
information



Define how
to measure
outcome /
exposure



Contribute
misleading
literature



Take
advantage
of scientific
illiteracy



Pose as
defender of
health or
truth



Blame other
causes



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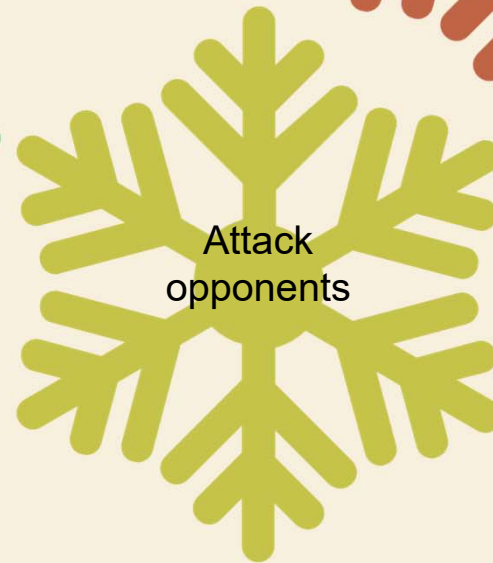
UNIQUE



Alter products
to seem
healthier



Inappropriately
question
causality



Attack
opponents



Make
strawman
arguments

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LOGICAL FALLACIES

Use of false authority: using an expert with unrelated credentials to promote the industry's position

Appealing to emotion: manipulating an emotional response in place of a valid, factual, compelling argument

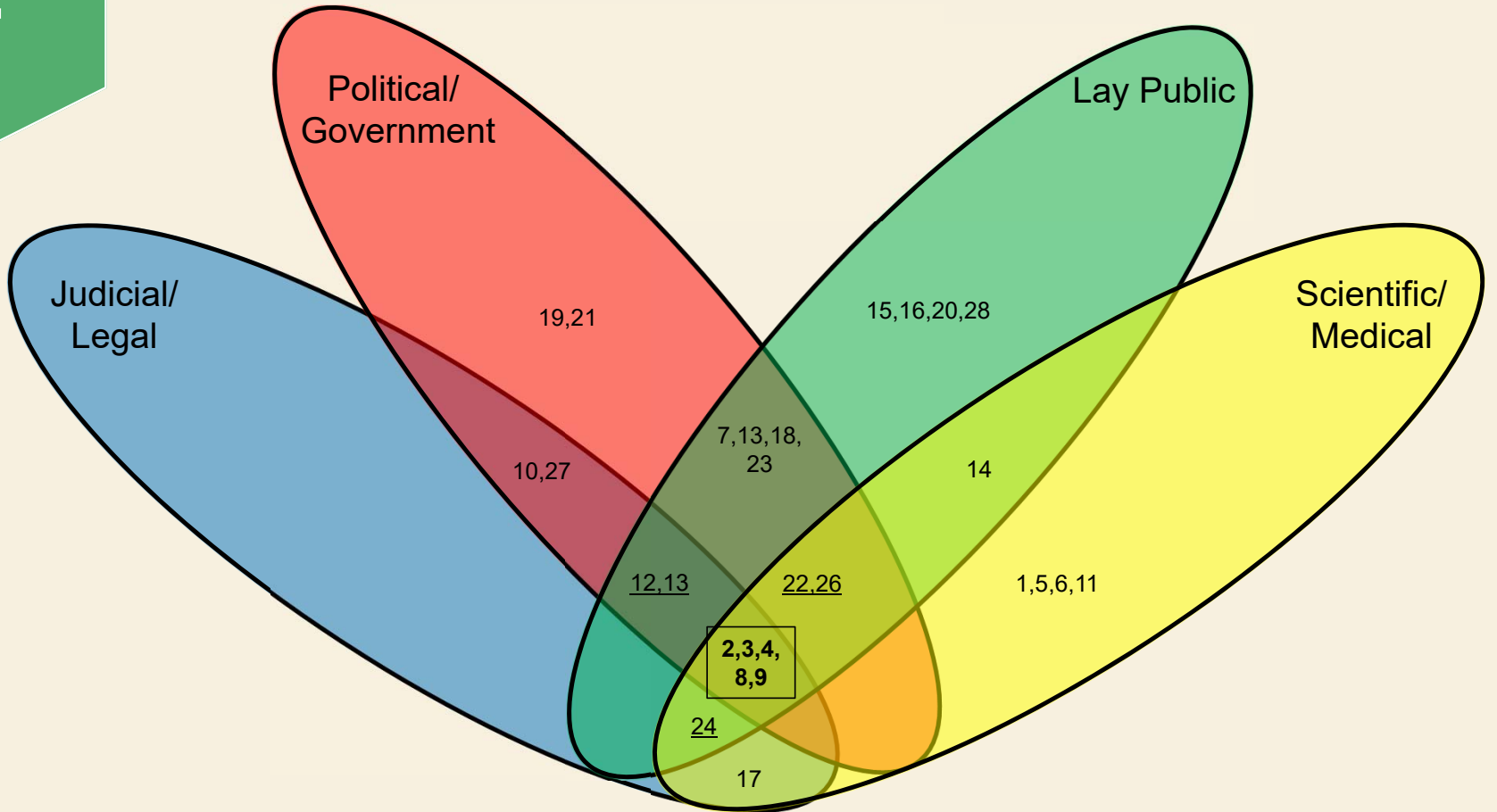
Ad hominem: by attacking the arguer instead of the argument, the argument can be dismissed

Righteousness Fallacy: using evidence of good intentions to support other claims

Appeal to authority (*ad vercundiam*): saying that because an "authority" believes something, it must be true

AUDIENCES

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WHAT HAVE WE LEARNED?

- There are many tactics used by industries to manufacture doubt
- A core set of these tactics appear to be essential, whereas another group are widely effective (but perhaps not essential)
- There are some unique tactics created by industries, but these are in the minority
- The tactics that are selected by an industry are related to the audience being targeted

CAN WE ADDRESS LOGICAL FALLACIES?

Learning to identify logical fallacies is an essential part of scientific training, and doing so requires “training in critical thinking and avoiding illogical thought patterns that often come naturally to humans.” Yet, even well-trained scientists can perform poorly on tests evaluating “straightforward” logical relationships.

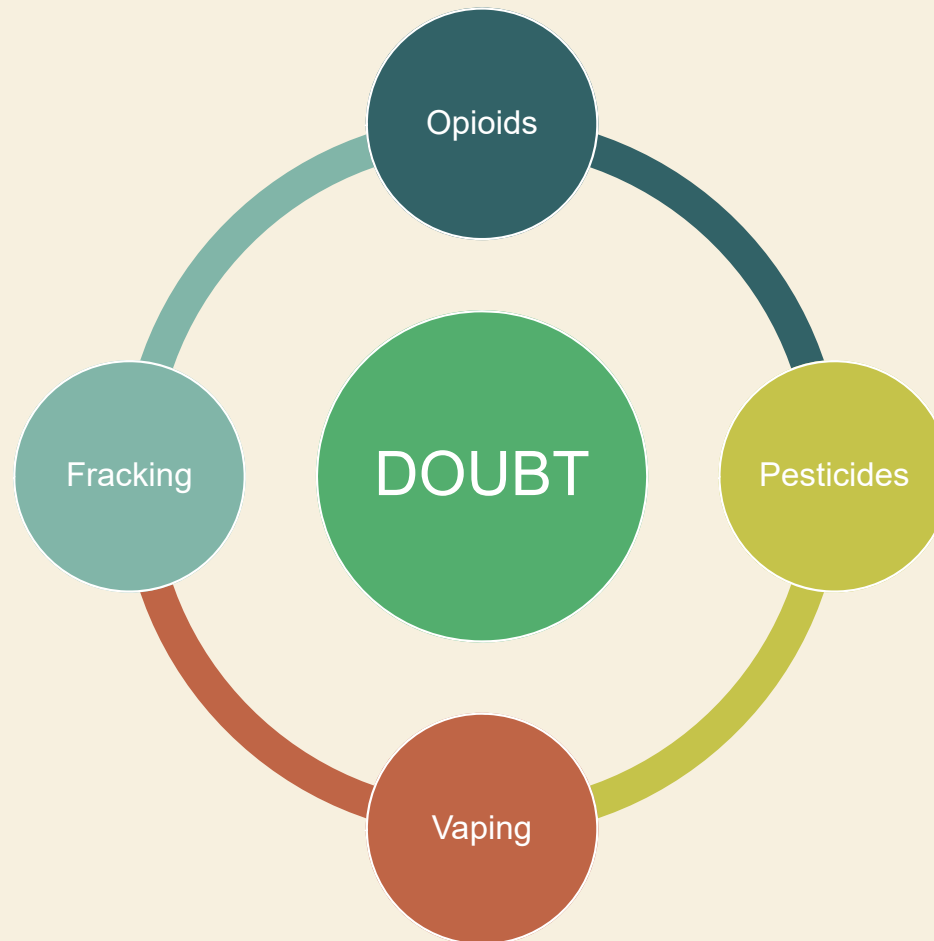
Casadevall & Fang, mBio 2016

Kern et al. Social Studies of Science 1983

WHO CAN MANUFACTURE DOUBT?



USING THIS TOOL



ACKNOWLEDGMENTS

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