

Business Ethics and Engineering

John Hooker
Carnegie Mellon University

October 2016



Outline

- Two case studies
- Ethical principles
 - Generalization principle
 - Utilitarian principle
 - Autonomy
- The case studies reconsidered
- Your issues
 - Please be ready to raise some issues.

Two Case Studies

Ford Pinto (1972)

Volkswagen emissions (2015)

Ford Pinto

- Early 1970s: Exploding gas tank in Ford Pinto
 - in low-speed collisions.



Ford Pinto

- The company knew of the danger.
 - Decided not to fix the defect.
 - Would have cost \$11 per car.
 - To fix bolts that punctured the gas tank on collision.



Ford Pinto

- Dennis Gioia was centrally involved.
 - Now a professor of business ethics and organizational behavior at Penn State.



Ford Pinto

- Gioia tells the story honestly in an article.

Pinto Fires and Personal Ethics:
A Script Analysis of Missed Opportunities

Dennis A. Gioia

Journal of Business Ethics **11**: 379–389, 1992.



Ford Pinto

- Gioia held engineering and MBA degrees.
 - He saw business as unethical.
 - But he thought he could make the world better by working within the system.
 - So he cut his long hair and joined Ford as Field Recall Coordinator.



Ford Pinto

- Cost-benefit analysis showed that the defect should not be fixed.

Costs: \$137 000 000

(Estimated as the costs of a production fix to all similarly designed cars and trucks with the gas tank aft of the axle (12 500 000 vehicles \times \$11/vehicle))

Benefits: \$49 530 000

(Estimated as the savings from preventing (180 projected deaths \times \$200 000/ death) + (180 projected burn injuries \times \$67 000/injury) + (2 100 burned cars \times \$700/car))

Ford Pinto

- 1978: Ford prosecuted for reckless homicide.
 - After 3 teenage girls were killed by exploding gas tank in Indiana.
 - Ford acquitted due to lack of evidence.

Ford Pinto

- Gioia later began using the Pinto case in his classes at Penn State.
- Then and for years afterward, he believed he had made the right decision at Ford, given the evidence at hand.
 - Then he changed his mind.
 - **Why?**

Ford Pinto

It is fascinating to me that for several years after I first conducted the living case with myself as the focus, I remained convinced that I had made the “right” decision in not recommending recall of the cars. In light of the times and the evidence available, I thought I had pursued a reasonable course of action. More recently, however, I have come to think that I really should have done everything I could to get those cars off the road.

Ford Pinto

- ❑ Gioia had **no convincing rational basis** for his views.
 - Neither for his decision at Ford
 - **Nor** for changing his mind later.





Ford Pinto

- Lesson: Normally, we make the wrong decision because **we don't know what is right.**
 - Not because we are bad people.

Ford Pinto

- ❑ Lesson: Normally, we make the wrong decision because **we don't know what is right.**
 - Not because we are bad people.
- ❑ We can rationalize almost anything.
 - How do we distinguish mere rationalization from correct analysis?
 - **This is why we have ethics.**



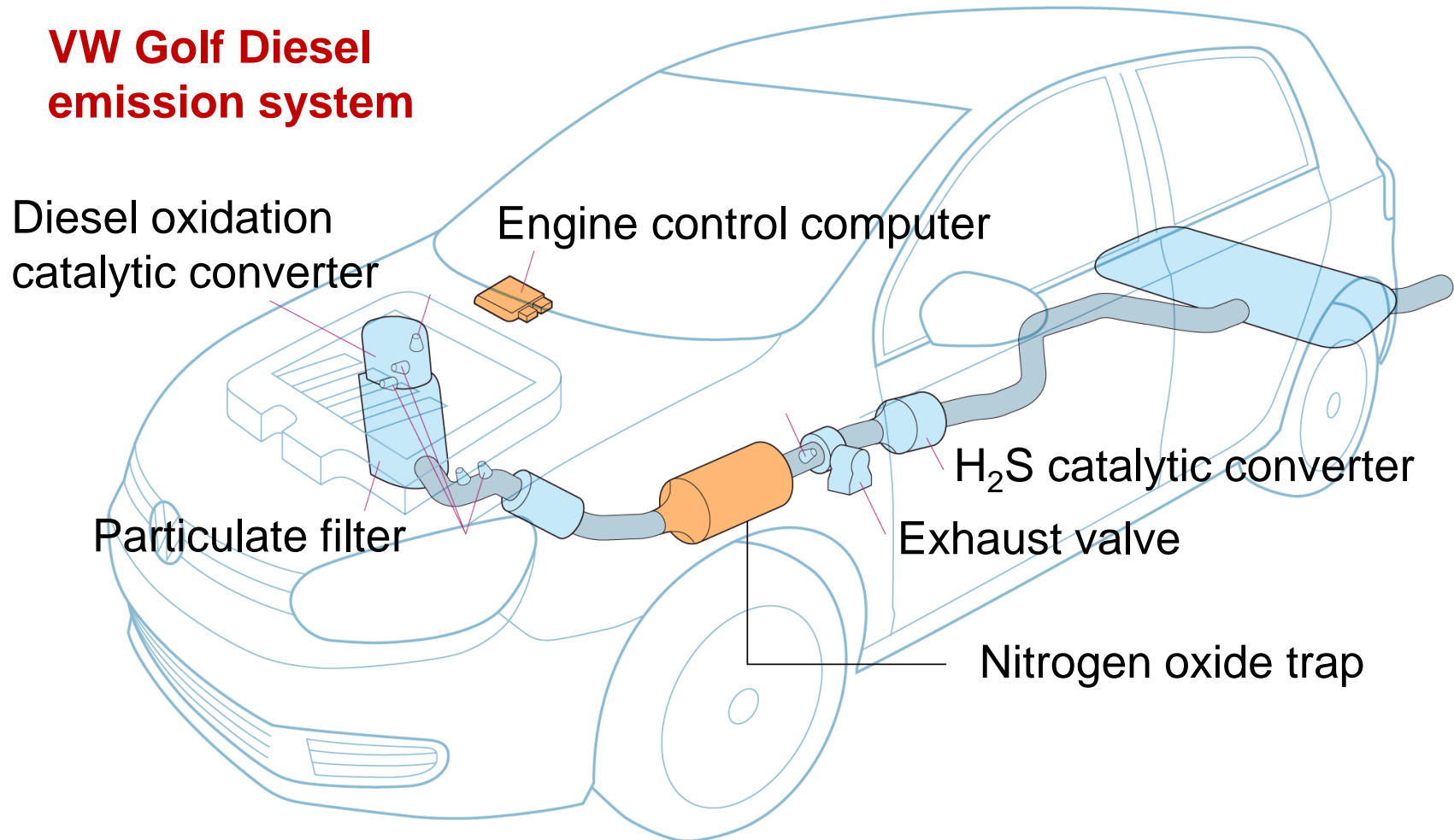
Volkswagen Emissions

- ❑ Several countries limit auto emissions.
 - As measured by a predetermined test cycle in a laboratory (not on the road).
 - During the last few years, Volkswagen Diesel cars **circumvented** the test...



Volkswagen Emissions

VW Golf Diesel emission system



Volkswagen Emissions

- ❑ VWs emit far more NO_x on the road than allowed by EPA.
 - Based on 2014 tests by engineers at West Virginia University.

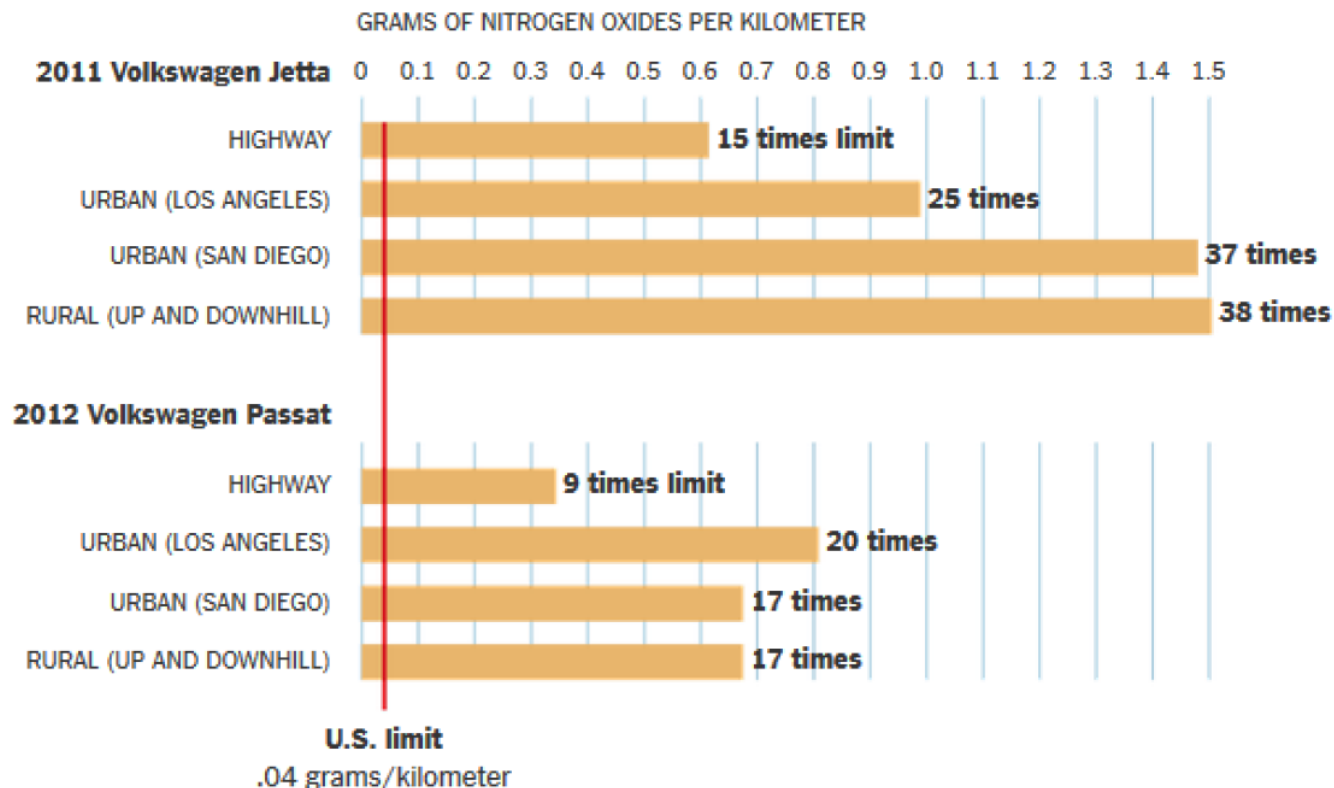
Arvind Thiruvengadam,
Engineering professor, WVU.

Ran initial tests that found
excess emissions.



Volkswagen Emissions

Average emissions of nitrogen oxides in on-road testing



Source: Arvind Thiruvengadam, Center for Alternative Fuels, Engines and Emissions at West Virginia University

Volkswagen Emissions

- ❑ EPA discovered patches in onboard software.
 - They cut emissions when they detect that an emissions test is running.
 - Altered software in **11 million** diesel cars worldwide.
 - “Largest scandal in automotive history.”



Volkswagen Emissions

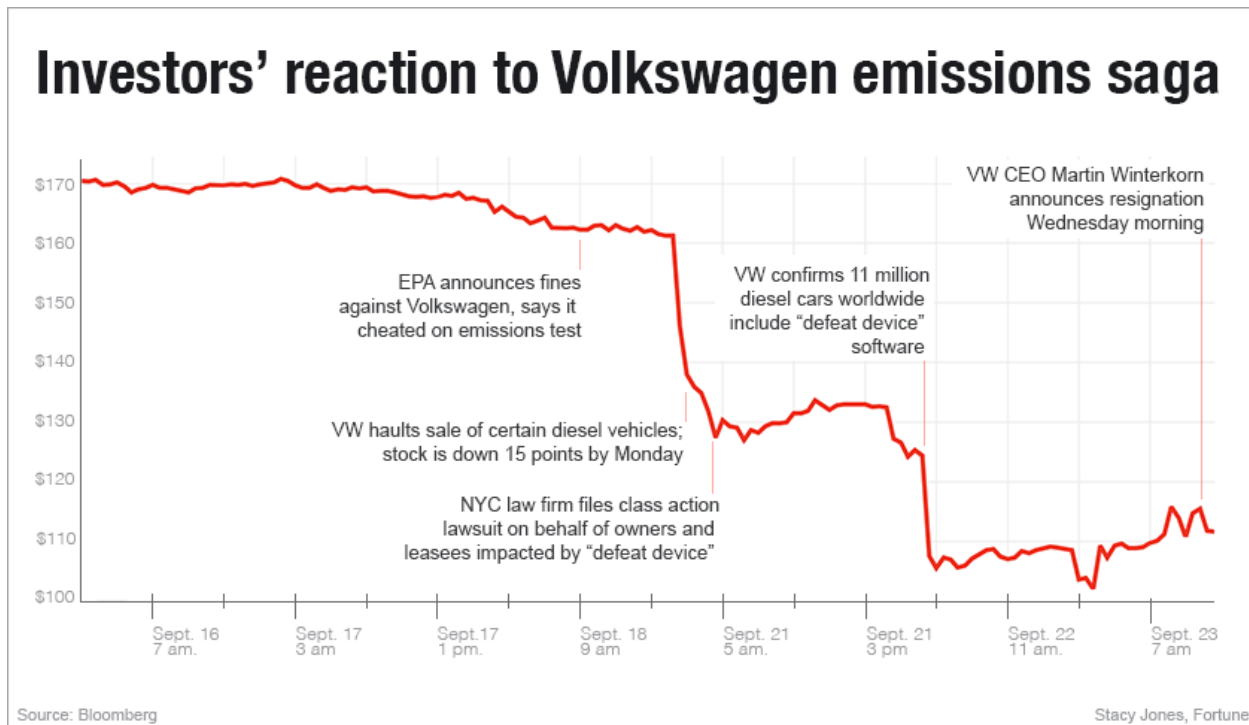
□ Repercussions.

- Company set aside \$20 billion to cover costs of scandal.
 - Won't be enough.
- CEO Martin Winterkorn resigned.
 - Other executives resigned or suspended



Volkswagen Emissions

- Repercussions.
 - VW stock fell 35% in one day.



Volkswagen Emissions

- Repercussions.
 - Possible prosecutions
 - German authorities considering criminal prosecutions against certain VW employees.
 - Threat to German economy
 - VW employs 274,000 in Germany, not counting suppliers.



Volkswagen Emissions

□ Repercussions.

■ U.S. settlements

- June: \$14.7 billion settlement with consumers
- This week: \$1.2 billion settlement with WV dealers.

■ Shareholder lawsuits

- 1400 lawsuits in Germany alone, seeking \$9 billion.



Volkswagen Emissions

- How could this happen?
 - We have few details so far, but some clues.
 - 2006 Powerpoint presentation on how to cheat
 - Top management repeatedly rejected employee proposals to reduce emissions, due to cost
 - 2014 memo to CEO
 - A possible rationalization...

Volkswagen Emissions

In a court filing, the company lawyers, as part of a defense in a shareholder lawsuit, suggest that the discrepancy was common knowledge within the industry. “The vehicles of all manufacturers exceed various emissions limits in normal street use,” Volkswagen lawyers said in a court filing, which was obtained by The Times. They further argued that the differences between road emissions and lab emissions were tolerated by regulators.

New York Times, 26 April 2016.

Volkswagen Emissions

- Possible rationalization
 - On-road emissions are always higher.
 - Cars are designed to perform well in test cycle.
 - Everyone knows this.
 - Tampering with software is no different in principle.
 - Just a clever way to achieve same result.

Ethical principles

Why we need them

Ethical principles

- We must have principles for resolving issues in an objective way.
 - Otherwise we can rationalize anything.
 - **Generalization principle**
 - **Utilitarian principle**
 - **Respect for autonomy**

Generalization principle

Generalization principle

- Basic premise: We always act for a reason.
 - Every action has a rationale.

Generalization principle

- Basic premise: We always act for a reason.
 - Every action has a rationale.
- So if the reason justifies the action for me...
 - It justifies the action for **anyone** to whom the reason applies.
 - Otherwise, it's not a reason,

Example - Theft

- Suppose I steal a watch from a shop.
- I have 2 reasons:
 - I want a new watch.
 - I won't get caught.
 - Security at the shop is relaxed.



Example - Theft

- So I am making a decision for everyone:
 - All who want a watch and think they won't get caught should steal one.



Example - Theft

- So I am making a decision for everyone:
 - All who want a watch and think they won't get caught should steal one.
- But if all do this, they will get caught.
 - The shop will install security.
 - My reasons will no longer apply.



Example - Theft

- I am not saying that all these people actually **will** steal watches.
 - Only that if they did, my reasons would no longer apply.



Example - Theft

- ❑ My reasons are **inconsistent** with the assumption that people will act on them.
- ❑ I am caught in a contradiction.
 - My reasons imply that these people **should** steal.
 - These same reasons presuppose that they will **not** steal.

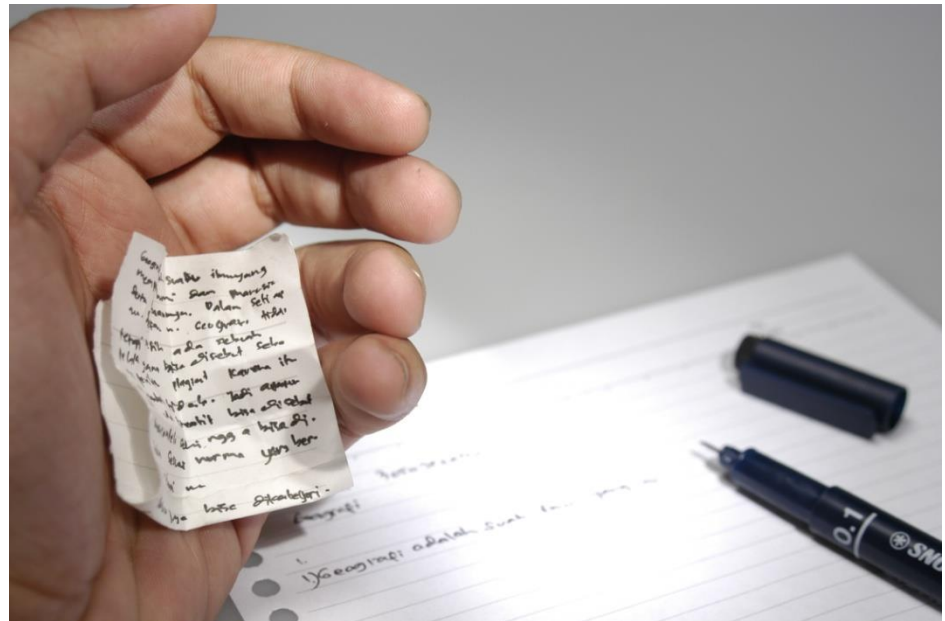


Generalization principle

- The principle is:
 - The reasons for an action should be consistent with the assumption that everyone with the same reasons acts the same way.

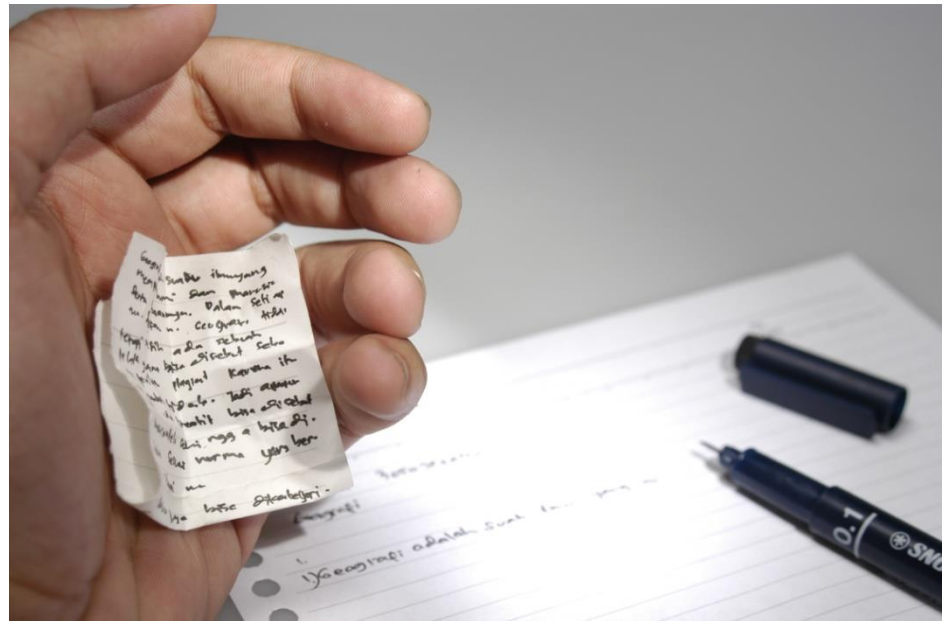
Example - Cheating

- ❑ What is wrong with cheating on an exam?
- ❑ My reasons:
 - I will get a better grade.
 - Which means I will get a better job.



Example - Cheating

- Nearly all students have these reasons.
- If they all cheat...
 - Everyone will have a top grade.
 - Good grades won't get me a better job.



Example – Agreements

- **Breaking an agreement** violates generalization principle.
 - If I break it merely for convenience or profit.
 - An agreement (or contract) is a mutual promise.

Example – Agreements

- Suppose everyone broke agreements when convenient.
 - It would be impossible to **make** agreements in the first place.
 - And therefore impossible to achieve my purposes by breaking them!
 - The whole point of having an agreement is that you keep it when you don't want to keep it.

Utilitarian principle

Utility

- Action is a means to an end.
 - You want to achieve some goal.
 - Maybe your ultimate goal is happiness.
 - Whatever it is, let's call it **utility**.

Utility

- Action is a means to an end.
 - You want to achieve some goal.
 - Maybe your ultimate goal is happiness.
 - Whatever it is, let's call it **utility**.
- Then you should try to create as much utility as you can.
 - The “greatest good for the greatest number.”

Utility

- More precisely, we should maximize **net expected utility**.
 - Multiply probability of each possible outcome by its utility (positive or negative).
 - Take algebraic sum.

Utility

- For example, suppose I listen to loud TV in my hotel room at 2 am.
 - Keeping other guests awake.
 - Why is this unethical?
 - May not violate hotel rules.

Utility

- For example, suppose I listen to loud TV in my hotel room at 2 am.
 - Keeping other guests awake.
 - Why is this unethical?
 - May not violate hotel rules.
- It reduces net utility.
 - Maybe it makes me a little happier.
 - But it substantially reduces utility of other guests.

Utilitarian principle

- An act is ethical only if I can rationally believe that no other act...
 - ...creates more net expected utility.
 - ...and satisfies other ethical principles.
 - Counts **everyone's** utility.



The underlying argument

- Why is it wrong to cause people (unnecessary) pain?

The underlying argument

- Why is it wrong to cause people (unnecessary) pain?
 - Perhaps because I think pain is inherently bad.
 - I should minimize the pain I cause.
 - It is the same with positive utility.

Autonomy

Autonomy

- Autonomy = self-law
 - I act **autonomously** when I freely make up my own mind about what to do, based on coherent reasons I give for my decision.
 - An **agent** is someone who can act autonomously.
 - Humans are agents, insects are not.





Autonomy

- Fundamental obligation: **respect autonomy**.
 - This rules out murder, coercion, slavery, etc.

Autonomy

- Fundamental obligation: **respect autonomy**.
 - This rules out murder, coercion, slavery, etc.
- To make this more precise...
 - An action has the form of an **action plan**.
 - **If** the reasons for my action apply, **then** do it.
 - Example: “If I want to catch the bus, and the bus stop is across the street, and no cars are coming, then cross the street.”

Autonomy

- Coercion does violate my autonomy if it is **consistent with my action plan.**
 - I start to cross the street to catch a bus, and you pull me out of the path of a car.
 - This is consistent with my action plan.
 - Not a violation of autonomy.

Autonomy

- ❑ Coercion does not violate autonomy if there is **implied consent**.
 - My employer tells me I must transfer to another city or be fired.
 - This is inconsistent with my action plan.
 - But by taking the job, I implicit agreed to abide by the company's business decisions.

Autonomy

- Coercion does not violate autonomy if it **prevents an unethical act.**
 - I can stop you from mugging someone.
 - This does not interfere with your action plan, because mugging is not an action plan.
 - It has no coherent rationale because it interferes with another person's autonomy.
 - But my interference must be **minimal** (interferes with no more than the unethical behavior).

Principle of Autonomy

- It is unethical to take an action that I am rationally constrained to believe will interfere with the ethical action plan of at least one other person without implied consent.
- It is unethical to throw a bomb into a crowd, even though I don't know which person(s) it will harm.

The Case Studies Reconsidered

Ford Pinto

Volkswagen emissions

Ford Pinto

- The cost-benefit analysis was a legitimate **utilitarian** calculation.
 - Considered net expected utility, measured in monetary terms.
 - Not just company cost.
 - Failure to fix the defect **may well have satisfied the utilitarian principle.**
 - But there are **two other principles** to satisfy!

Ford Pinto

- ❑ Failure to fix violates **generalization principle**.
 - Violation of **implied warranty**.
 - There is an implied **agreement** that the product is fit for the purpose for which it is sold.
 - A known **defect** that poses a lethal hazard makes the car **unfit** for transportation.
 - Violation of this agreement, merely for profit or convenience, is contrary to generalization principle.

Ford Pinto

- Failure to fix violates **autonomy**.
 - Ford was rationally constrained to believe that the defect would cause serious injury or death for at least one person.
 - In fact, many people (as assumed by their cost/benefit analysis).
 - This is **violation of autonomy** without implied consent.

Ford Pinto

- ❑ Failure to fix violates **autonomy**.
 - Why no implied consent?
 - True, all car manufacturers are rationally constrained to believe that people will be killed in their cars.
 - But customers give implied consent to this danger, because they assume the normal risks of driving.
 - A defective gas tank is not normal and therefore not a risk assumed by the customer.

Volkswagen emissions

- **No obvious violation of the utilitarian principle.**
 - VW engineers might rationally believe that the expense of reducing emissions, and the resulting damage to sales & the company, might outweigh the damage of additional NO_x in the atmosphere.

Volkswagen emissions

- **No obvious violation of autonomy.**
 - Additional NO_x in the atmosphere might cause illness or death for some people, but it is not enough to show probability.
 - VW engineers must be **rationally constrained** to believe this, and they were not.

Volkswagen emissions

- Tampering with the software appears to be **illegal**, at least in the US.
 - Violating the law, merely for convenience or profit, is **contrary to the generalization principle**.
 - Principled civil disobedience has a different analysis.
 - No evidence that this was a motivation.

Volkswagen emissions

- The element of **deception** violates the **generalization principle**.
 - It is true that manufacturers game the system.
 - On-road emissions are greater than in the test cycle.
 - But on-road emissions bear **some relation** to test results.
 - VW's emissions are **9 to 38 times greater** than in the test.

Volkswagen emissions

- VW therefore **deceived** governments and the public.
 - **Deception** merely for convenience or profit **violates the generalization principle**.
 - If everyone did it, no one would be deceived, which is **inconsistent** with the **reasons** for the deception.
 - In particular, if all manufacturers used VW's trick, VW would have been caught, which again defeats its purpose.

Your issues



Fiduciary duty

- Fiduciary duty is based on an **agreement** with stockholders (owners).
 - I am an **agent** for the owners.
 - I act on their behalf.
 - I promise to make their investment **profitable** in exchange for my salary.



Fiduciary duty

- ❑ Breaking this agreement violates the generalization principle.



Fiduciary duty

- But some people say that the **only** duty of business people is to **maximize profit** for the owners.



Fiduciary duty

- The prior question is:
 - Would my action be ethical for the **owners**?
 - If not, the owners can't ethically ask me to do it for them.
 - I have no ethical obligation to do something unethical.



Choice of career

- Not generalizable.
 - If the reason for becoming a surgeon is simply to maximize utility.
 - If generalized, it would no longer maximize utility.
 - Everyone would be a heart surgeon.
 - Reasons must be more specific.



Choice of career

- What kind of choice is ethical?
 - I should choose a career that I can reasonably believe maximizes overall utility, given who I am...
 - ...given my interests, abilities, and dreams.

