The Trolley Problem

Ethics and decision-making

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1 warm up

Discuss these questions with your teacher. Give extended answers with reasons and examples.

1. **The Dilemma:** Imagine a runaway trolley is heading towards five workers on a track. You can pull a lever to divert it to another track, but there is one worker there. Would you pull the lever? Why or why not?

2. **Action vs. Inaction:** Do you think there is a moral difference between actively causing harm to one person and doing nothing while five people are hurt? Does it matter who "caused" the problem?

3. **Rules vs. Results:** Is it ever right to break a moral rule — such as "do not cause harm" — if the outcome saves more lives? Can you think of a real-life situation where someone faced this kind of impossible choice?

4. **Machines and Morality:** Who do you think should be responsible for programming ethical decisions into self-driving cars — engineers, politicians, or society as a whole?

5. **Trusting Technology:** Can you think of other situations where machines already make decisions that affect people's safety? Do you personally trust these machines? Why or why not?

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2 video comprehension

Watch the TED-Ed video, then complete all three parts.

Video:https://www.youtube.com/watch?v=yg16u_bzjPE —TED-Ed: "Would You Sacrifice One Person to Save Five?" — Eleanor Nelsen (5 min)

Part A — True or False. Write T (True) or F (False). If false, write the correct version on the line below.

#	Statement	T / F
1	In the trolley problem, you are driving the runaway trolley when you notice the workers on the track.	___
	If false, correct it:	
2	In surveys, about 90% of people say they would flip the switch to save five workers, letting one die.	___
	If false, correct it:	
3	Utilitarianism argues that the best moral decision is the one that benefits the greatest number of people.	___
	If false, correct it:	
4	In the bridge variant, about 90% of people also say it is acceptable to push the man off the bridge to save five.	___
	If false, correct it:	
5	Research shows that men and women respond differently to the bridge variant of the trolley problem.	___
	If false, correct it:	

Part B — Fill in the Gaps. Use the words in the box to complete each sentence.

WORD BANK:
divert · sacrifice · utilitarian · emotional · ethical

1. You happen to be standing next to a switch that will _____ the trolley onto a second track.
2. Do you _____ one person to save five?
3. The _____ view argues that the best decision is the one that benefits the greatest number of people.
4. In the bridge version, the _____ response is much stronger than in the original scenario.
5. Self-driving cars and military drones are making _____ analysis more important than ever.

Part C — Comprehension Questions. Answer in full sentences. Focus on main ideas, cause and effect, and interpretation.

1. What is the trolley problem, and why does Eleanor Nelsen describe it as a popular ethical dilemma? Who originally created it?

2. What is the key difference between the original switch scenario and the "fat man" bridge variant? Why do most people respond very differently to each, even though the outcome is the same?

3. What does the video reveal about the role of brain activity and emotion in moral decision-making? How does the brain respond differently in the two scenarios?

4. How does the video connect the trolley problem to real-world technology such as self-driving cars and military drones? What challenge does this create?

5. In your opinion, why does physically pushing someone feel more morally wrong than pulling a lever, even if the result — one person dies to save five — is identical?

3 pre-reading vocabulary

Read, repeat, and master these words before reading the article.

bystander | intervene | utilitarian | algorithm | autonomous | premeditation | consequentialist | redetermined | ethical dilemma | causal chain

Match each word or phrase (1–10) with the correct definition (A–J). Write the letter in the answer box.

#	Word / Phrase	Ans.	Definition
1	**bystander**	___	A. A set of rules or instructions followed by a computer to solve a problem or make a decision
2	**intervene**	___	B. The sequence of causes and effects that connects one event to its final result
3	**utilitarian**	___	C. Planned or decided in advance, before the moment of action
4	**algorithm**	___	D. A difficult situation in which a person must choose between two options, both of which may cause harm
5	**autonomous**	___	E. Relating to the view that the best moral choice is the one that produces the greatest benefit for the greatest number of people
6	**premeditation**	___	F. Already decided or set before a situation arises; not chosen in the moment
7	**consequentialist**	___	G. A person who is present at an event but does not directly take part in it
8	**predetermined**	___	H. Capable of operating independently, without direct human control
9	**ethical dilemma**	___	I. The act of thinking about and planning an action before carrying it out
10	**causal chain**	___	J. Related to the idea that the moral value of an action is judged entirely by its outcome or consequences

Now use three of the words above in original sentences related to technology, ethics, or decision-making.

1. _____
2. _____
3. _____

4 reading

Read the article silently. Six phrases have been removed and replaced with gaps (1)–(6). Use the phrase list on the next page to fill each gap.

The Trolley Problem and Self-Driving Cars — Benjamin R. Dierker | fee.org

First posed in the early 20th century, the Trolley Problem is one of the most widely recognized questions in ethics and moral philosophy. The problem asks what a bystander should do upon seeing an unmanned trolley hurtling down a set of tracks toward five people who are tied up. There is a lever the bystander can pull to divert the trolley onto an alternate track, but it would then hit one person who is tied up on that track. Effectively, the bystander must immediately determine whether he would rather passively watch five people die or (1) .

In its original form, the Trolley Problem raises two main questions: (1) how the bystander would react on an impulsive emotional level and (2) how he should react on a morally rationalized level. The problem is set up for utilitarianism — in short, (2) . But there are other moral frameworks to consider, including the alternative of purely consequentialist thinking — that pulling the lever saves more people and is almost certainly the right answer.

The Car as the Trolley

Themost relevantform of the Trolley Problem today is the self-driving car. Unlike the snap decision required of a real-life bystander, the team of designers, programmers, ethicists, and engineers designing the self-driving car have the luxury of deciding what calculations are optimal (3) . In this way, the programming team is like the bystander in the Trolley Problem, as they are effectively predetermining when to "pull the lever" by coding it into the vehicle's algorithms.

Once the car is on the road in self-driving mode, the lever pulls are (4) , while the driverless car becomes the trolley. Self-driving cars are still controlled in some sense by humans, but they are removed several steps in the causal chain by preprogramming "levers" ahead of time. Furthermore, while the original Trolley Problem only has two track-bound outcomes, autonomous vehicles open up a nearly infinite set of outcomes in the dynamic setting of an open road.

Does the Nature of Death Change?

In the case of the self-driving car, the programmer must weigh different scenarios and determine that certain deaths are justifiable. While no death resulting from an autonomous vehicle would be a murder, (5) . Whereas a reflex- reaction accident is entirely void of premeditation, a programmer is in some sense thinking ahead and deciding on values and algorithmic decisions. Even if autonomous vehicles reduce deaths on the road, fewer deaths are almost signed off ahead of time rather than in-the-moment accidents.

A move toward autonomous vehicles means we must (6) and program it into our vehicles in anticipation of future tragedies. These vehicles may guarantee a far lower rate of tragedies than our current human-piloted vehicles, but when drivers give up control, a slight moral shift occurs because the resulting deaths — though fewer — are no longer the result of human error and accident, but the result of predetermined algorithms.

Gap-Fill — Phrase List. Eight phrases are listed below. Six belong in gaps (1)–(6) in the article. Two phrases were NOT taken from the article. Choose carefully.

Phrase	Option
A	*the nature of the death changes*
B	*saving the greatest number possible*
C	*determine some standard of value for human life*
D	*the car reacts in real time using only sensor data*
E	*predetermined by a programmer who functions as a bystander*
F	*actively intervene and cause the death of one person to save five others*
G	*long before the car is manufactured*
H	*emotional instinct overrides all programmed logic*

⚠Two of the phrases above do NOT appear in the article. Read carefully before choosing your answers.

Reading Comprehension. Answer in full sentences using evidence from the article.

1. **Main Idea.** What is the central argument of the article? How does the author use the trolley problem to explain the ethical challenges of self-driving cars?

2. **Interpretation.** The article says programmers are "like the bystander in the Trolley Problem." In what ways are they similar? In what important way are they different?

3. **Critical Thinking.** The article argues that even if autonomous vehicles cause fewer deaths, those deaths are "signed off ahead of time." Do you think this makes them more or less acceptable than deaths caused by human error? Why?

4. **Ethical perspective.** The article says that when drivers give up control to a self-driving car, "a slight moral shift occurs." What does the author mean by this? Do you think this moral shift is significant enough to slow down or stop the development of autonomous vehicles?

5. **Social Purpose.** The article ends by asking whether society is comfortable with programmers "pulling the lever" on our behalf. What responsibilities do governments and citizens have in deciding how autonomous vehicles should be programmed?

5 listening practice

Listen to the debate between Anna and Mark, then complete both parts.

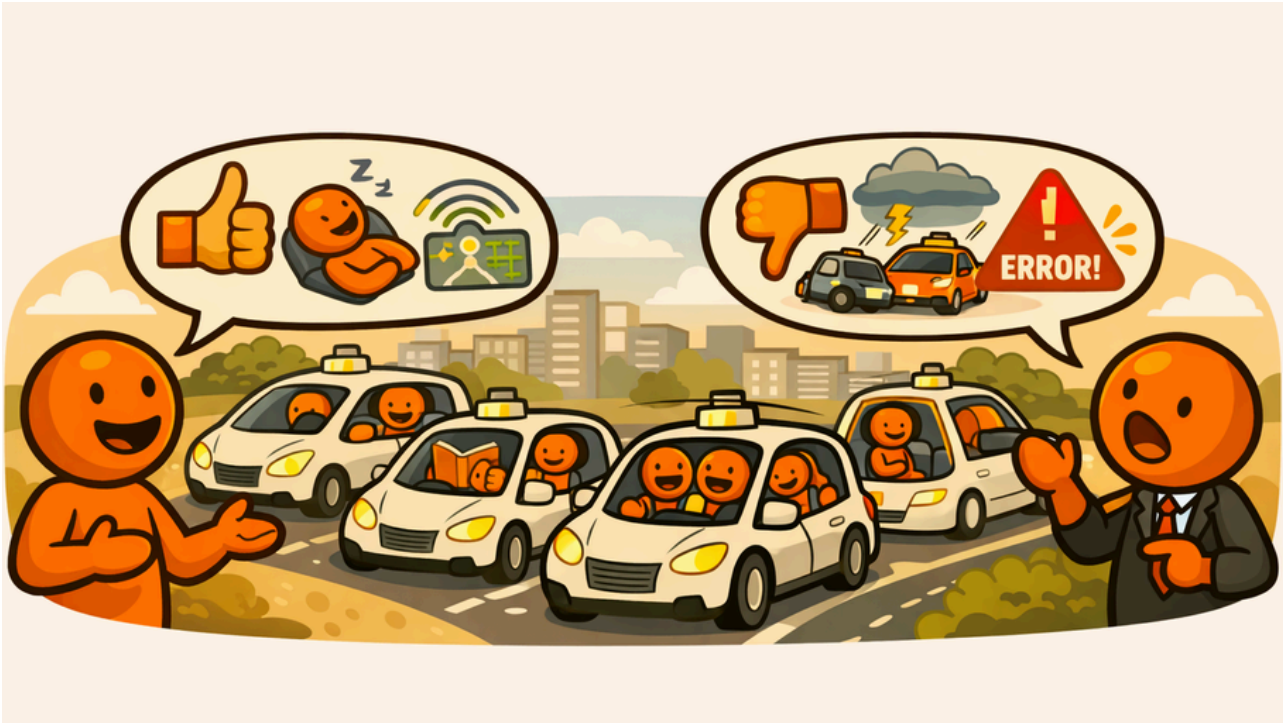
🎧 **Audio: Debate — "Self-Driving Cars and the Trolley Problem"**

You will hear a conversation between **Anna** (who supports self-driving cars) and **Mark** (who has concerns). Listen carefully to their arguments and the specific words they use.

Part A — Fill in the Gaps. Listen to the audio and complete each sentence with the missing word.

WORD BANK:
programmed · empathy · emergencies · minimize · responsibility

1. Anna believes the system can be _____ to choose the option that saves the most people.
2. Mark argues that, unlike humans, machines cannot feel _____ or understand feelings.
3. Anna suggests that the car could drive most of the time, with the human taking control in _____.
4. Anna says that following clear rules means the car can act faster and can _____ harm.
5. Mark reminds Anna that technology is not only about progress, but also about values and _____.



Part B — Comprehension and Discussion Questions. Answer in full sentences using ideas from the audio.

1. Anna argues that self-driving cars are safer because computers do not get tired or make emotional decisions. Do you agree? Are there advantages she does not mention?

2. Mark says emotions are important in decision-making. Can you think of a situation where a human's emotional response might actually lead to a better outcome than a machine following fixed rules?

3. Mark raises the point that different cultures have different values — what is "fair" in one country may not be fair in another. How might this create real problems if engineers in one country program the moral rules for cars used worldwide?

4. Anna and Mark agree that the debate is "not about yes or no, but about how and when." What conditions would need to be in place before you would personally feel safe using a fully self-driving car?

5. The debate ends with the question: "Are we ready to trust machines with life-and-death decisions?" How would you answer this question? Give at least two reasons.

6 language point: modals — deductions about the present

Use modal verbs to say how certain you are that some thing is true right now.

How Certain Are You? Using Modals to Make Deductions

When we want to say how sure we are that something is (or is not) true **right now**, we use modal verbs of deduction. We don't know for certain — we are making a logical guess based on evidence.

Modal	Certainty Level	Example
must + infinitive	Very sure it IS true (positive)	*"The programmer must spend months testing the algorithms."*
can't + infinitive	Very sure it is NOT true (negative)	*"These rules can't cover every possible situation on the road."*
might / could / may + infinitive	Possible but not certain (50/50)	*"The car might face a trolley-problem situation in a real crash."*

MUST — VERY SURE (POSITIVE)

"Theengineer mustbe exhausted — she has been working for 16 hours."
"Self-driving cars must reduce human error — the data clearly shows it."

CAN'T — VERY SURE (NEGATIVE)

"That algorithmcan't beperfect — no system can predict every outcome."
"Mark can't agree with Anna completely — he still has serious concerns."

MIGHT / COULD / MAY — POSSIBLE

"The carmight already beprogrammed to avoid pedestrians."
"The engineers could be working on a solution right now."

⚠COMMON MISTAKE

DoNOTuse **mustnot** for deduction — that means "prohibition."
"You must not drive without a licence." ≠ "It can't be true."

ⓘTo make a **negative deduction**, always use **can't** (not "must not"). To make a **positive deduction**, use **must**. For uncertainty, use **might, could,** or **may**.

Part B — Controlled Practice. Choose the correct modal verb (a or b) to complete each sentence.

1. The programmer has been working for 12 hours — she _____ be exhausted. (a) must (b) can't

2. That decision _____ be random — there must be a clear rule behind it. (a) might (b) can't

3. The self-driving car keeps slowing down — the sensors _____ be detecting something on the road. (a) could (b) must not

4. Engineers _____ know which ethical choice is correct — this is one of the most complex problems in philosophy. (a) can't (b) must

5. The algorithm _____ already be designed to protect passengers first — that seems to be the priority. (a) may (b) can't

Part C — Free Practice. Write your own sentences using modal verbs for deduction.

1. A self-driving car has suddenly stopped in the middle of the road for no clear reason. Write 2–3 sentences using **must, might** and **can't** to suggest possible reasons.

2. Think of someone you know who has strong opinions about technology. Write 2 sentences using modal verbs to describe what they **must** or **might** think about self-driving cars.

3. Write 3 sentences about the trolley problem using **must, might**, and **can't** to make deductions about what the right choice is or why it is so difficult.

7 discussion

Give extended answers. Connect ideas from the video, article, and audio debate.

1. The video shows that 90% of people would pull a switch to divert a trolley but only 10% would push a man off a bridge — even though the outcome is the same. What does this difference reveal about how we really make moral decisions?

2. The FEE article argues that self-driving car programmers are effectively "pulling the lever" on behalf of all future passengers. Is this more or less ethical than a human driver making the same split-second decision?

3. The video mentions that driverless cars and military drones face similar ethical programming challenges. Should the same moral rules apply to both? Why or why not?

4. Mark raises the concern that different cultures have different values. Who, in your view, should have the final say on the ethical programming of self-driving cars — engineers, governments, or the public?

5. The article ends by suggesting that society must decide whether it is comfortable with programmers "pulling the lever" on our behalf. Do you think the public is currently informed enough to make this decision? What would need to change for ordinary people to have a real voice in how self-driving cars are programmed?

homework

Complete before your next lesson. Written output required.

Opinion Essay (150–200 words)

Respond to the following statement:

"A self-driving car that is programmed to save the greatest number of lives is always making the most ethical decision."

Write a carefully structured opinion essay. Your response must:

- State clearly whether you **agree** or **disagree** in your opening sentence — do not hedge
- Use at least **one idea from the TED-Ed video** (e.g. the utilitarian view, the bridge variant, or emotional responses)
- Use at least **one idea from the FEE article** (e.g. the programmer as bystander, the nature of death, or predetermination)
- Include a real-world example — a technology, a historical event, or a situation from everyday life
- Use modal verbs of deduction (**must, might, can't, could**) at least **twice**
- End with a sentence that goes beyond cars — connecting your argument to a wider question about society, technology, or ethics

Bring your written essay to the next lesson. Be prepared to read it aloud, defend your position, and discuss any challenges or counter-arguments.

Video Transcript

Imagine you're watching a runaway trolley barreling down the tracks straight towards five workers who can't escape. You happen to be standing next to a switch that will divert the trolley onto a second track. Here's the problem. That track has a worker on it, too, but just one. What do you do? Do you sacrifice one person to save five? This is the trolley problem, a version of an ethical dilemma that philosopher Philippa Foot devised in 1967. It's popular because it forces us to think about how to choose when there are no good choices. Do we pick the action with the best outcome or stick to a moral code that prohibits causing someone's death? In one survey, about 90% of respondents said that it's okay to flip the switch, letting one worker die to save five, and other studies, including a virtual reality simulation of the dilemma, have found similar results. These judgments are consistent with the philosophical principle of utilitarianism which argues that the morally correct decision is the one that maximizes well-being for the greatest number of people. The five lives outweigh one, even if achieving that outcome requires condemning someone to death. But people don't always take the utilitarian view, which we can see by changing the trolley problem a bit. This time, you're standing on a bridge over the track as the runaway trolley approaches. Now there's no second track, but there is a very large man on the bridge next to you. If you push him over, his body will stop the trolley, saving the five workers, but he'll die. To utilitarians, the decision is exactly the same, lose one life to save five. But in this case, only about 10% of people say that it's OK to throw the man onto the tracks. Our instincts tell us that deliberately causing someone's death is different than allowing them to die as collateral damage. It just feels wrong for reasons that are hard to explain. This intersection between ethics and psychology is what's so interesting about the trolley problem. The dilemma in its many variations reveal that what we think is right or wrong depends on factors other than a logical weighing of the pros and cons. For example, men are more likely than women to say it's okay to push the man over the bridge. So are people who watch a comedy clip before doing the thought experiment. And in one virtual reality study, people were more willing to sacrifice men than women. Researchers have studied the brain activity of people thinking through the classic and bridge versions. Both scenarios activate areas of the brain involved in conscious decision-making and emotional responses. But in the bridge version, the emotional response is much stronger. So is activity in an area of the brain associated with processing internal conflict. Why the difference? One explanation is that pushing someone to their death feels more personal, activating an emotional aversion to killing another person, but we feel conflicted because we know it's still the logical choice. "Trolleyology" has been criticized by some philosophers and psychologists. They argue that it doesn't reveal anything because its premise is so unrealistic that study participants don't take it seriously. But new technology is making this kind of ethical analysis more important than ever. For example, driver-less cars may have to handle choices like causing a small accident to prevent a larger one. Meanwhile, governments are researching autonomous military drones that could wind up making decisions of whether they'll risk civilian casualties to attack a high-value target. If we want these actions to be ethical, we have to decide in advance how to value human life and judge the greater good. So researchers who study autonomous systems are collaborating with philosophers to address the complex problem of programming ethics into machines, which goes to show that even hypothetical dilemmas can wind up on a collision course with the real world.

Audio Transcript

Anna: I really believe self-driving cars can make our roads safer. Computers don't get tired, they don't drink alcohol, and they don't text while driving.

Mark: That sounds good, but computers can fail too. What if the car faces a situation like the trolley problem? Who decides which person should be saved?

Anna: The system can be programmed to minimize harm. For example, it could choose the option that saves the most people. Isn't that better than a human driver making a quick, emotional decision?

Mark: But emotions are important. A human driver can feel empathy. Machines don't understand feelings. Imagine your family is in the car — would you trust a computer to make that choice?

Anna: Yes, because emotions can sometimes make things worse. If the car follows clear rules, it can act faster and more fairly.

Mark: But who writes those rules? Engineers? Politicians? Different cultures have different values. What is "fair" in one country may not be fair in another.

Anna: That's true, but we already trust technology in many areas — airplanes, medical devices, even online banking. Self-driving cars are just another step forward.

Mark: Still, the trolley problem shows that some choices are impossible. Sometimes there is no "good" answer. I think humans should stay in control, not machines.

Anna: Maybe the best solution is a mix — humans and machines working together. For example, the car could drive most of the time, but the human could take control in emergencies.

Mark: That sounds better, but I'm still worried. What if the human doesn't react quickly enough?

Anna: Then training and education will be important. People will need to learn how to work with these cars, just like pilots train to fly planes with autopilot.

Mark: I see your point. But I still think we should move slowly. Technology is powerful, but we must be careful.

Anna: I agree. Maybe the debate is not about "yes or no," but about "how" and "when."

Mark: Exactly. We need to ask: Are we ready to trust machines with life-and-death decisions?

Anna: And that's why the trolley problem is so useful — it makes us think about these hard questions.

Mark: Yes, and it reminds us that technology is not only about progress, but also about values and responsibility.

Anna: So maybe the real answer is not just about cars, but about society. How do we want to live with machines?

Mark: That's a big question. And I think it's one we will keep discussing for many years.

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