Supplementary Materials

Experiment 1

Table S1a.	**Agents condition causal judgments**			
Norm violation:	Alex only	Neither	Both	Benni only
Standard	0	1	3	27
Unintended	8	0	10	5
Ignorant	21	0	16	8
Deceived	26	0	6	0

Table S1b.	**Action condition causal judgments**			
Norm violation:	Alex's action only	Neither	Both	Benni's action only
Standard	1	0	15	17
Unintended	2	0	20	16
Ignorant	3	0	28	12
Deceived	2	0	30	14

Table S1c.	**Artifacts condition causal judgments**			
Norm violation:	Fertilizer A X300 only	Neither	Both	Fertilizer B Y33 only
Standard	0	0	28	8
Unintended	0	1	22	8
Ignorant	1	0	33	10
Deceived	2	0	29	6

Table S1. Participants' causal judgments of the agents, actions, and artifacts in Experiment 1 (tables S1a-c) in each norm violation condition (rows). The norm violation is always the rightmost column.

Table S2a.	**Agents condition relevance judgments**			
Norm violation:	Alex only	Neither	Both	Benni only
Standard	0	0	12	19
Unintended	6	1	13	3
Ignorant	22	0	20	3
Deceived	22	0	10	0

Table S2b.	**Action condition relevance judgments**			
Norm violation:	Alex's action only	Neither	Both	Benni's action only
Standard	1	1	24	7
Unintended	4	2	24	8
Ignorant	0	1	36	6
Deceived	1	2	41	2

Table S2c.	**Artifacts condition relevance judgments**			
Norm violation:	Fertilizer A X300 only	Neither	Both	Fertilizer B Y33 only
Standard	0	1	30	5
Unintended	0	3	24	4
Ignorant	1	3	40	0
Deceived	2	3	30	2

Table S2. Participants' counterfactual relevance of the agents, actions, and artifacts in Experiment 1 (tables S2a-c) in each norm violation condition (rows). The norm violation is always the rightmost column.

Statistical comparison	**S & W**	**Cause**	**Relevance**
Effect of question within each story condition			
Standard violation	43.02^{***}	30.18^{***}	18.55^{***}
Unintended violation	26.89^{***}	20.78^{***}	10.10^{*}
Ignorant violation	48.80^{***}	35.40^{***}	52.06^{***}
Deception violation	64.42^{***}	73.64^{***}	54.98^{***}
Effect of story within each question condition			
Chemical/event	4.23^{ns}	4.36^{ns}	10.54^{ns}
Person/event	13.71^{*}	6.16^{ns}	14.27^{*}
Agent	79.72^{***}	79.37^{***}	62.80^{***}
Difference from standard violation for the agent question condition			
Unintended violation	17.50^{***}	26.43^{***}	16.23^{***}
Ignorant violation	42.46^{***}	38.76^{***}	34.22^{***}
Deception violation	58.41^{***}	53.99^{***}	41.18^{***}

Table S3. Comparison of key statistical tests in S&W and the same tests performed on participants' causal and relevance judgments in Experiment 1. Values reported are chi-square for the effect described in the original manuscript, the causal judgment of Experiment 1, and the relevance judgment of Experiment 1. * = $p < .05$, *** = $p < .001$.

Probability Estimates We did not observe an effect of condition on participants' estimates of the percentage of flowers that dried, this was true of estimates when only A X200® was applied, $F(3,435) = 0.06$, $p = 0.981$, when only B Y33® was applied, $F(3,435) = 0.09$, $p = 0.966$, and

when both were applied, $F(3,435) = 0.64$, $p = 0.588$. This pattern precisely replicates the one observed in S&W.

Experiment 1 Materials: Vignettes

***Background*:**

Tom has a huge garden and loves flowers. Because he has less and less time for gardening lately, he employed two gardeners who take care of the plants on his 30 flower beds: Alex and Benni.

Both can independently decide on their working hours and arrange who cares for which flower beds. They decided that there will be some flower beds which only one of them will take care of and others that they will both take care of, but on alternate days.

Alex and Benni are very reliable and Tom is satisfied with their work. Nevertheless he wants to optimize the plant growth.

Since Tom has read in a magazine that plants grow better when they are fertilized, he decides to let Alex and Benni fertilize his plants. The magazine recommends the use of the chemicals **A X200®** or **B Y33®**, since both are especially effective.

However, Tom also read that it can damage plants when they are exposed to multiple different types of chemicals. Tom therefore decides that he only wants to use one fertilizer. He goes for **A X200®**.

[This text was then followed by one of the four sections below according to condition]

1. ***Standard Norm Violation:***

Tom instructs Alex and Benni to buy the chemical A X200® and to use only this fertilizer.

Alex volunteers for buying several bottles of this chemical for Benni and himself.

After a few weeks, Tom goes for a walk in his garden. **He realizes that some of his plants are much prettier and bigger than before. However, he also realizes that some of his plants have lost their beautiful color and are dried up.**

That makes Tom very sad and reflective. He wonders whether the drying of his plants might have something to do with the fertilization. He wants to investigate this matter and talks to Alex and Benni.

Alex tells him that he followed Tom's instructions and only bought and used the chemical **A X200®**.

However, Benni tells him that he had used the chemical **B Y33®** instead. He still had some bottles of this chemical in stock at home and wanted to use them up.

Since some flower beds were only fertilized by Alex or only fertilized by Benni, but others by both, Tom asks Alex and Benni to make a detailed plan about which of his 30 flower beds had been fertilized by whom in the last few weeks. Afterwards, he takes a closer look at the flower beds.

He realizes that the plants were bigger and more beautiful where only one single chemical had been used (i.e., only A X200® or only B Y33®).

They were dried up in the flower beds on which both A X200® and B Y33® were applied by the gardeners.

2. ***Unintended Norm Violation*:**

Tom instructs Alex and Benni to buy the chemical A X200® and to use only this fertilizer.

Alex volunteers for buying several bottles of this chemical for Benni and himself.

After a few weeks, Tom goes for a walk in his garden. **He realizes that some of his plants are much prettier and bigger than before. However, he also realizes that some of his plants have lost their beautiful color and are dried up.**

That makes Tom very sad and reflective. He wonders whether the drying of his plants might have something to do with the fertilization. He wants to investigate this matter and talks to Alex and Benni.

Alex tells him that he followed Tom's instruction: "I only bought and used the chemical A X200® which I had funneled into the blue can."

Benni suddenly is startled and says to Alex: "What? You funneled A X200® into the *blue* can? But you told me you had funneled it into the *green* can! That's why I always used the green can!"

Alex replies: "Did I? Then I am sorry!"

Tom remembers that he had filled B Y33® in a green can - long before he had read about the chemicals in his magazine. He had never used it. **So Benni must have accidentally, without knowing it, applied the chemical B Y33®, whereas only Alex applied A X200®.**

Since some flower beds were only fertilized by Alex or Benni, but others by both, Tom asks Alex and Benni to make a detailed plan about which of his 30 flower beds had been fertilized by whom in the last weeks. Afterwards, he takes a closer look at the flower beds.

He realizes that the plants were bigger and more beautiful where only one single chemical had been used (i.e., only A X200® or only B Y33®).

They were dried up in the flower beds on which both A X200® and B Y33® were applied by the gardeners.

3. ***Ignorant norm violation*:**

When Tom meets Alex in the garden shortly afterwards, he instructs him to buy the chemical A X200® and to use only this fertilizer. He also explicitly instructs him to tell Benni to only use A X200®.

Alex volunteers to buy several bottles of this chemical for Benni and himself and to tell Benni about Tom's instruction.

After a few weeks, Tom goes for a walk in his garden. **He realizes that some of his plants are much prettier and bigger than before. However, he also realizes that some of his plants have lost their beautiful color and are dried up.**

That makes Tom very sad and reflective. He wonders whether the drying of his plants might have something to do with the fertilization. He wants to investigate this matter and talks to Alex and Benni.

Alex immediately starts apologizing: "I am sorry! I completely forgot to tell Benni about the rule! I bought and used the chemical **A X200®** but Benni must have used something else because he did not know about the new rule."

Benni tells Tom that Alex had not told him that they were only supposed to use A X200®. He explains: "I have used the fertilizer I previously used; it is called **B Y33®**!"

Tom remembers that he had filled B Y33® in a green can - long before he had read about the chemicals in his magazine. He had never used it. **So Benni must have accidentally, without knowing it, applied the chemical B Y33®, whereas only Alex applied A X200®.**

Since some flower beds were only fertilized by Alex or Benni, but others by both, Tom asks Alex and Benni to make a detailed plan about which of his 30 flower beds had been fertilized by whom in the last weeks. Afterwards, he takes a closer look at the flower beds.

He realizes that the plants were bigger and more beautiful where only one single chemical had been used (i.e., only A X200® or only B Y33®).

They were dried up in the flower beds on which both A X200® and B Y33® were applied by the gardeners.

4. ***Deceived Norm Violation:***

When Tom meets Alex in the garden shortly afterwards, he instructs him to buy the chemical A X200® and to use only this fertilizer. He also explicitly instructs him to tell Benni to only use A X200®.

Alex volunteers to buy several bottles of this chemical for Benni and himself and to tell Benni about Tom's instruction.

After a few weeks, Tom goes for a walk in his garden. **He realizes that some of his plants are much prettier and bigger than before. However, he also realizes that some of his plants have lost their beautiful color and are dried up.**

That makes Tom very sad and reflective. He wonders whether the drying of his plants might have something to do with the fertilization. He wants to investigate this matter and talks to Alex and Benni.

After some interrogation, Alex finally confesses that he had told Benni that Tom wanted them to buy and use the chemical B Y33® instead of A X200®. He wanted Benni to use the wrong fertilizer and to get fired because he wanted to have more working hours to earn more money. He himself only used **A X200®**.

Benni tells Tom that Alex had told him that they were only supposed to use B Y33®. He therefore only used **B Y33®** without knowing that Tom actually intended both gardeners to use A X200®.

Since some flower beds were only fertilized by Alex or Benni, but others by both, Tom asks Alex and Benni to make a detailed plan about which of his 30 flower beds had been fertilized by whom in the last weeks. Afterwards, he takes a closer look at the flower beds.

He realizes that the plants were bigger and more beautiful where only one single chemical had been used (i.e., only A X200® or only B Y33®).

They were dried up in the flower beds on which both A X200® and B Y33® were applied by the gardeners.

Experiment 1 materials: Questions

Control Questions

Which chemical(s) were actually applied by each gardener? (you may select one, both, or neither for each gardener)

	Chemical A X200®	Chemical B Y33®
Alex	□	□
Benni	□	□

Which chemical(s) did Tom WANT each of the gardeners to use? (you may select one, both, or neither for each gardener)

	Chemical A X200®	Chemical B Y33®
Alex	□	□
Benni	□	□

Please estimate what percentage of the flowers dried up in each of the categories below (0% = none of the flowers dried up, 100% = all of the flowers dried up). We are looking for an estimate based on the story, you were not given exact numbers.

- Plants that were ONLY fertilized with chemical A X200® (0 – 100)
- Plants that were ONLY fertilized with chemical B Y33® (0 – 100)
- Plants that were fertilized with BOTH chemicals (0 – 100)

Primary Dependent Variables

Causation:

Agent Condition

Who caused the plants to be dried out? (select one or more)

- Alex
- Benni

Action Condition

What caused the plants to be dried out? (select one or more)

- The fertilization by Alex
- The fertilization by Benni

Artifact Condition

What caused the plants to be dried out? (select one or more)

- The application of chemical A X200®
- The application of chemical B Y33®

***Counterfactual Relevance*:**

Agent Condition

Now suppose that some people are discussing the fact that the flowers dried up and wondering how things could have been different. In thinking about who could have acted differently, please tell us whether it would be relevant or irrelevant to focus on the following people:

	Relevant	**Irrelevant**
Alex	□	□
Benni	□	□

Action Condition

Now suppose that some people are discussing the fact that the flowers dried up and wondering how things could have been different. In thinking about what could have happened differently, please tell us whether it would be relevant or irrelevant to focus on the following things:

	Relevant	**Irrelevant**
The fertilization by Alex	□	□
The fertilization by Benni	□	□

Artifact Condition

Now suppose that some people are discussing the fact that the flowers dried up and wondering how things could have been different. In thinking about what could have happened differently, please tell us whether it would be relevant or irrelevant to focus on the following things:

	Relevant	**Irrelevant**
The application of chemical A X200®	□	□
The application of chemical B Y33®	□	□

Experiment 2

(Vignettes reproduced from Icard, Kominsky, & Knobe, 2017; the counterfactual relevance measure is the only addition)

<table>
<tr><td>1a) Conjunctive: Billy and Suzy inherited an unusual type of hybrid car that has two special car batteries called Bartlett batteries. The car won't start unless it has two Bartlett batteries. Having one battery isn't enough to start the car. When they got the car, both Bartlett batteries were missing.</td><td>1b) Disjunctive: Billy and Suzy inherited an unusual type of hybrid car that has two special car batteries called Bartlett batteries. The car won't start unless it has at least one Bartlett battery. Having a second Bartlett battery isn't necessary to start the car. When they got the car, both Bartlett batteries were missing.</td></tr>
<tr><td>2a) No violation: One day, Billy and Suzy are both out of the house. Billy is visiting his friend's house, and notices that his friend has a Bartlett battery. Billy asks his friend to sell the battery to him, and his friend says that he's willing to sell it for a fair price, so Billy buys the Bartlett battery from his friend.</td><td>2b) Norm violation: One day, Billy and Suzy are both out of the house. Billy is visiting his friend's house, and notices that his friend has a Bartlett battery. Billy asks his friend to sell the battery to him, but his friend says that he can't sell it because he needs it for his own car. Billy waits until his friend is in the bathroom, and then steals the Bartlett battery from his friend.</td></tr>
<tr><td colspan="2">3) Event: Meanwhile, on the other side of town, Suzy walks into an automotive parts shop and happens to notice that they have a single Bartlett battery in stock. Suzy decides to buy the Bartlett battery from the shop. When Billy and Suzy get home, they installed the two Bartlett batteries.</td></tr>
<tr><td>1a) Conjunctive (con't): Since the car now had both Bartlett batteries, they were able to start the car.</td><td>1b) Disjunctive (con't): Since all the car needed was at least one Bartlett battery, they were able to start the car.</td></tr>
<tr><td colspan="2">Causal agreement statement: They were able to start the car because of Billy</td></tr>
<tr><td colspan="2">Counterfactual Relevance Measure: Now suppose that some people are discussing this story and wondering how things could have been different. In thinking about who could have acted differently, please tell us how relevant or irrelevant it would be to focus on the following:

Billy</td></tr>
</table>

Table S4. Battery vignette from Experiment 2.

<table>
<tr><td colspan="2">1) Background: Billy and Suzy are freight train conductors. One day, they happen to approach an old two-way rail bridge from opposite directions at the same time. There are signals on either side of the bridge.</td></tr>
<tr><td>2a) No violation: Billy’s signal is green, so he is supposed to drive across the bridge immediately. Suzy’s signal is green, so she is also supposed to drive across immediately.</td><td>2b) Norm violation: Billy’s signal is red, so he is supposed to stop and wait. Suzy’s signal is green, so she is supposed to drive across immediately.</td></tr>
<tr><td>3a) Conjunctive: Neither of them realizes that the bridge is on the verge of collapse. If they both drive their trains onto the bridge at the same time, it will collapse. Neither train is heavy enough on its own to break the bridge, but both together will be too heavy for it.</td><td>3b) Disjunctive: Neither of them realizes that the bridge is on the verge of collapse. If either of them drives their train onto the bridge, it will collapse. Either train is heavy enough on its own to break the bridge.</td></tr>
<tr><td>2a) No violation (con’t): Billy follows his signal and drives his train onto the bridge immediately at the same time that Suzy follows her signal and drives her train onto the bridge. Both trains move onto the bridge at the same time, and at that moment the bridge collapses.</td><td>2b) Norm violation (con’t): Billy decides to ignore his signal and drives his train onto the bridge immediately at the same time that Suzy follows her signal and drives her train onto the bridge. Both trains move onto the bridge at the same time, and at that moment the bridge collapses.</td></tr>
<tr><td colspan="2">Causal agreement statement: Billy caused the bridge to collapse</td></tr>
<tr><td colspan="2">Counterfactual Relevance Measure: Now suppose that some people are discussing this story and wondering how things could have been different. In thinking about who could have acted differently, please tell us how relevant or irrelevant it would be to focus on the following:

Billy</td></tr>
</table>

Table S5. Train vignette from Experiment 2.

Experiment 3

Counterfactual Manipulation: Agent condition

We would like you to think about Professor Smith's decision to take a pencil from the vending machine. Please consider and describe one relevant way that things could have gone differently such that the professor would not have taken one of the pencils from the vending machine.

How could things have gone differently such that Professor Smith would not have taken a pencil from the vending machine? What would have happened if Professor Smith had not taken a pencil?

(Please write at least a couple of sentences.)

Counterfactual Manipulation: Artifact condition

We would like you to think about the way the red lever functioned to produce a pencil from the vending machine. Please consider and describe one relevant way that things could have gone differently such that the red lever would not have functioned to produce one of the pencils from the vending machine.

How could things have gone differently such that the red lever would not have functioned to produce a pencil from the vending machine? What would have happened if the red lever had not produced a pencil?

(Please write at least a couple of sentences.)

Counterfactual Manipulation: No counterfactual

Now we would like you to consider everything that happened in the story your read.

Please write a description of what actually happened in the story your read.

(Please write at least a couple of sentences.)

Control Questions

Which levers were actually pulled in the original story you read?

(Please mark all that apply).

- o The red lever
- o The black lever
- o The white lever

Who actually received a pencil in the original story you read?

(Please mark all that apply).

- o Professor Smith

- The administrative assistant\
- The student

Causation Questions

Agent Question

Please tell us whether you agree or disagree with the following statement about the original story you read:

Professor Smith caused the problem.

[Slider scale from 0 (Completely disagree) to 100 (Completely agree)]

Artifact Question

Please tell us whether you agree or disagree with the following statement about the original story you read:

The red lever caused the problem.

[Slider scale from 0 (Completely disagree) to 100 (Completely agree)]

Experiment 4

Control Questions

What are each of the levers **supposed** to deliver?

	Pencil	Eraser
Red lever	□	□
Black lever	□	□

What did each person actually receive from the vending machine after they pulled the lever? (Check all boxes that apply.)

	Pencils	Erasers
Professor Smith	□	□
The administrative assistant	□	□

According to the department's rules, which office supplies was each person allowed to take from the vending machine? (Check all boxes that apply.)

	Pencils	Erasers
Professor Smith	□	□
The administrative assistant	□	□

Manipulation Check Questions

One of the levers could be used to get erasers. How likely was this lever to malfunction?

Please indicate your answer using the scale below (with 0 meaning maximally unlikely and 100 meaning maximally likely)

[Scale from 0 – 100]

Please tell us whether you agree or disagree with this statement about Professor Smith:

It was morally wrong for Professor Smith to pull the red lever.

[Scale from 1 ('Strongly agree') to 7 ('Strongly disagree') with a midpoint of 4 ('Neither agree nor disagree')]

Primary Dependent Variables

Causation:

Agent Condition

Who caused the problem? (select one or more)

- The administrative assistant
- Professor Smith

Artifact Condition

What caused the problem? (select one or more)

- The black lever
- The red lever

Counterfactual Relevance

Agent Condition

Now suppose that some people are discussing the problem the student had and wondering how things could have been different. In thinking about who could have acted differently, please tell us whether it would be relevant or irrelevant to focus on the following people:

	Relevant	**Irrelevant**
The administrative assistant	□	□
Professor Smith	□	□

Artifact Condition

Now suppose that some people are discussing the problem the student had and were wondering how things could have been different. In thinking about what could have happened differently, please tell us whether it would be relevant or irrelevant to focus on the following things:

	Relevant	**Irrelevant**
The black lever	□	□
The red lever	□	□