The Science of Stories

FICTION vs. FACT

Problem:
How will reading a fiction story or a nonfiction story affect a person's opinion on a certain topic?

Variables

- Independent Variable
  - The story read by the person
- Dependent Variable
  - The person's opinion on a certain topic as measured by answers to survey questions
- Control Variables
  - The fiction group will read the same fiction story and the nonfiction group will read the same nonfiction story.
  - The survey questions will stay the same for both groups.
  - The format of the form will stay the same for both groups.
  - The order in which the experiment is conducted will stay the same for both groups.
  - The topic of both stories will be the same for both groups.

Hypothesis

If two groups of people take the same survey before and after reading a story, but one group reads a fiction story and one group reads a nonfiction story, then the fiction story will change people's opinions more, because fiction stories are more emotional and can influence people's thoughts, feelings, and opinions.

Materials

➢Computer

➢ Google Docs (for writing stories)

➢Fiction Story: Diary of a Polar Bear by Ella Taliaferro

➢Nonfiction Story: Climate Change: An Overview by Ella Taliaferro

➢ 10 Question Survey (on Google Forms)

➢ 30 Volunteers (15 in each group)

➢ Gmail (for emailing the form to volunteers)

➢ Google Sheets and Excel (for creating graphs)

➢Pencil & Paper (for brainstorming)

Procedures

1. Prepare the Google Form by writing stories (fiction and nonfiction), writing survey questions, and importing them into the form.
   - The form order is as follows:
     - The survey questions
     - The story (a fiction story for the fiction group and a nonfiction story for the nonfiction group)
     - The same survey questions again
     - General demographic questions (name, age, and gender)
2. Randomly separate 30 volunteers into two groups: 15 in fiction & 15 in nonfiction.
3. Email the corresponding Google Form to the volunteers based on their group. Ask them to answer the questions without sharing the premise of the experiment.
4. Create the graphs from the data collected by the forms.
5. Analyze the data from the graphs.
6. Draw conclusions.

Data Collection Tables: Responses Before →After

Fiction Group:

Question Number	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	8→11	7→4	0→0	0→0	0→0
2	7→8	7→6	1→1	0→0	0→0
3	8→8	5→6	2→1	0→0	0→0
4	8→8	4→6	2→0	1→1	0→0
5	6→9	9→6	0→0	0→0	0→0
6	7→10	7→5	1→0	0→0	0→0
7	6→7	6→8	3→0	0→0	0→0
8	10→11	4→4	1→0	0→0	0→0
9	8→10	7→5	0→0	0→0	0→0
10	7→9	7→5	1→1	0→0	0→0

Nonfiction Group:

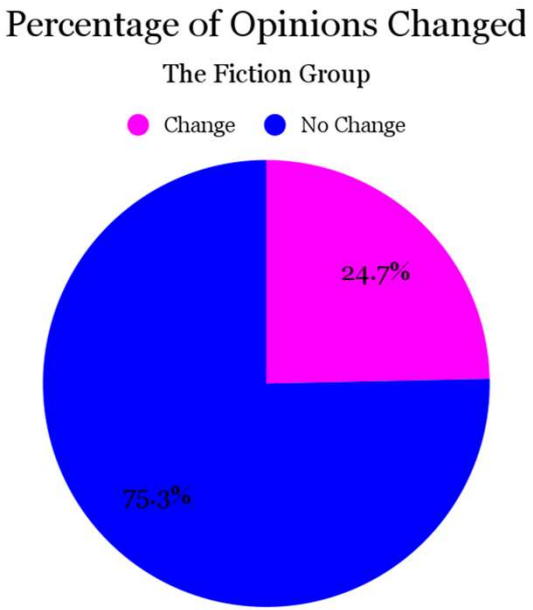
Question Number	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	10→12	3→2	2→1	0→0	0→0
2	5→6	9→8	1→1	0→0	0→0
3	1→4	8→9	6→2	0→0	0→0
4	4→8	5→4	6→3	0→0	0→0
5	7→10	8→5	0→0	0→0	0→0
6	9→10	4→4	2→1	0→0	0→0
7	3→7	9→7	2→0	1→1	0→0
8	6→9	6→5	3→1	0→0	0→0
9	9→11	4→3	2→1	0→0	0→0
10	4→7	6→6	4→1	1→1	0→0

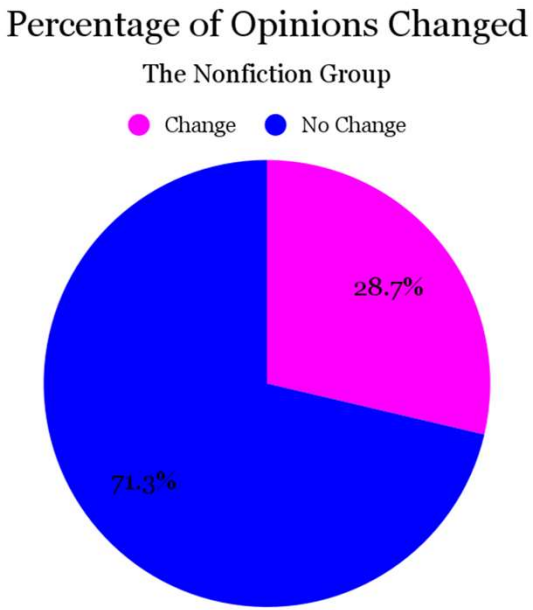
Data Collection Tables: Responses Broken Down By Age

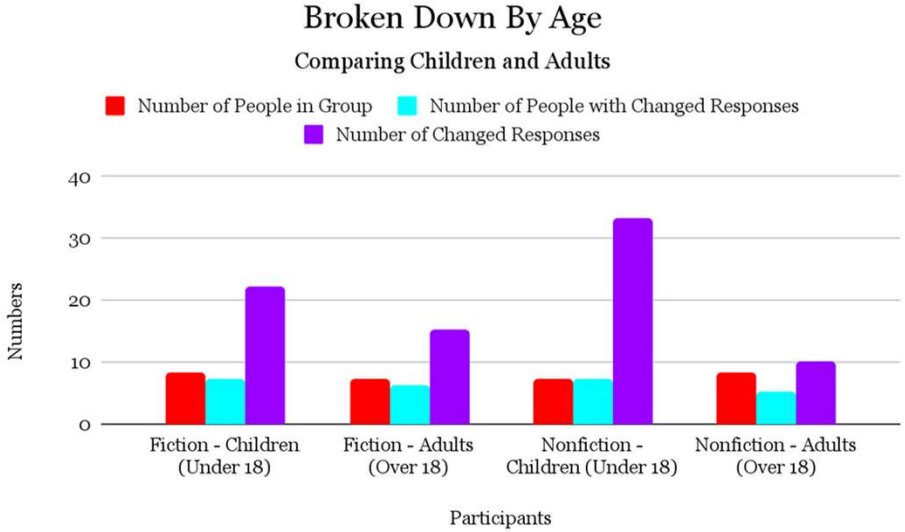
Fiction Group	Number of People in Group	Number of People with Changed Responses	Percent of People Changing	Number of Changed Responses
Children (Under 18)	8	7	88%	22
Adults (Over 18)	7	6	86%	15

Nonfiction Group	Number of People in Group	Number of People with Changed Responses	Percent of People Changing	Number of Changed Responses
Children (Under 18)	7	7	100%	33
Adults (Over 18)	8	5	63%	10

Data Analysis Graphs







Data Analysis

- In the fiction group, 24.7% of their opinions changed.
- In the nonfiction group, 28.7% of their opinions changed.
- Zero people strongly disagreed with any of the survey questions before or after reading the story.
- The survey questions with the highest number of strongly agrees are as follows:
  - Fiction group before: Question 8: “People and animals in other countries are suffering due to climate change” 10 out of 15
  - Fiction group after: A tie between Question 1: “I believe global warming is a serious problem” and Question 8: “People and animals in other countries are suffering due to climate change” 11 out of 15
  - Nonfiction group before: Question 1: “I believe global warming is a serious problem” 10 out of 15
  - Nonfiction group after: Question 1: “I believe global warming is a serious problem” 12 out of 15
- The votes were never unanimous for any question. At least three people picked something else that was not the majority.

Data Analysis

- When the data was broken down by age, the results showed:
  - 100% of children in the nonfiction group changed their opinions.
  - More adults changed their opinions in the fiction group than the nonfiction group.
  - More children changed their opinions in the nonfiction group than the fiction group.
  - In the fiction group, the percent of people changing their opinion was similar (88% of children and 86% of adults)
  - The children always changed their opinions more compared to the adults (88% vs. 86% for the fiction group, and 100% vs. 63% for the nonfiction group)
- Some sources of error for this experiment include:
  - The questions written for the survey might not have adequately captured the opinions of participants.
  - The majority of participants already agreed with what the story was trying to convince them of, so reading the story wouldn't change their opinions very much.
  - The stories were wildly different in length: the fiction story was 1,047 words long, and the nonfiction story was only 328 words long (that's a difference of 719 words).

Pictures of the Experiment

Survey questions answered by all participants before and after reading a story.
The available answers were:
Strongly Agree, Agree, Neutral, Disagree, and Strongly Disagree.

1. *I believe global warming is a serious problem.*
2. *Humans are mainly responsible for climate change.*
3. *Global warming will have a big impact during my lifetime.*
4. *I feel personally motivated to help reduce climate change.*
5. *We should change our lifestyles to help protect the environment.*
6. *Global warming should be a high priority for the government.*
7. *Stories and personal experiences help me understand global warming better.*
8. *People and animals in other countries are suffering because of climate change.*
9. *World leaders should be doing more to fight global warming.*
10. *I am extremely worried about global warming.*

Nonfiction Story:
Climate Change: An Overview by Ella Taliaferro

"Scientific evidence for warming of the climate system is unequivocal," says the Intergovernmental Panel on Climate Change, or IPCC. Climate change is a life-threatening problem in our society and needs to be addressed immediately.

According to NASA, "Global temperature is rising… the ocean is getting warmer… the ice sheets are shrinking… glaciers are retreating… snow cover is decreasing… sea level is rising… arctic sea ice is declining… [and] ocean acidification is increasing." They also report that "the planet's average surface temperature has risen about 2 degrees Fahrenheit (1 degrees Celsius) since the late 19th century." In addition, they state, "While Earth's climate has changed throughout its history, the current warming is happening at a rate not seen in the past 10,000 years." All of these anomalies add up to one fact: climate change is a serious problem.

"Carbon dioxide from human activities is increasing about 250 times faster than it did from natural sources after the last Ice Age," says NASA. NOAA backs that up by saying, "There is more carbon dioxide in the atmosphere. Carbon dioxide is 50% higher than it was before the Industrial Revolution."

Climate change also has an impact on health. According to the WHO, "Climate change is impacting human lives and health in a variety of ways. It threatens the essential ingredients of good health – clean air, safe drinking water, nutritious food supply and safe shelter – and has the potential to undermine decades of progress in global health."

In short, climate change is threatening to undermine Earth, and we must stop it now.

Works Cited

NASA. "Evidence." *Science.nasa.gov*, NASA, 23 Oct. 2024, science.nasa.gov/climate-change/evidence/. This site also provided the IPCC quote.

National Oceanic and Atmospheric Administration. "Climate Change Impacts." *National Oceanic and Atmospheric Administration*, NOAA, 13 June 2025, www.noaa.gov/education/resource-collections/climate/climate-change-impacts.

World Health Organization. "Climate Change." *World Health Organization*, World Health Organization: WHO, 9 Aug. 2019, www.who.int/health-topics/climate-change#tab=tab_1.

Pictures of the Experiment

Fiction Story:
Diary of a Polar Bear by Ella Taliaferro

Dear Diary, 1

The weirdest thing happened this morning!

Like always, Yuki spent *forever* seal hunting. She didn't even acknowledge me or Neve!

Neve didn't seal hunt at all, instead stealing seals Yuki left unattended. Classic Neve.

And me? I got a few seals, and made sure NOT to leave them unattended since it's so hard to find seals these days, and I don't want Neve to steal my food. Neve eyed them hungrily, but a stare made him back off.

"What do you guys want to do?" I asked Neve, after he had gulped down another one of Yuki's seals.

"Dunno, Havaska," he responded. "I checked out the research station yesterday, and was set to check it out today, but I think the humans left. Something about the ice not being stable. They were stressing about climate change, too. Do you know what that is?"

I shook my head. "Never heard of it."

"They mentioned something about how ice is shrinking and global temperatures are rising," said Neve.

"Where'd you learn that?" I asked.

"Eh, one of the researchers was giving this whole speech like 'we must act now!' and all that."

My eyes widened. "What else did you overhear?"

Neve looked deep in thought. "Seals are delicious."

I laughed, but something didn't seem right.

A weird sound blasted my eardrums, and I dropped into a Havaska ball on the ice. Neve did the same. We had our paws over our heads and started whimpering.

"What's that?" Yuki shrieked, running over to us. "Neve! Havaska!"

"Get down, Yuki!" hissed Neve angrily.

Yuki copied our position. We waited for the sound to go away, but it only got louder.

Finally, it stopped. Neve stood up shakily. "What's that, Havaska?"

I popped up. It was a bright orange machine with blades above it. Two humans were standing around it, staring us down.

"Yuki, I think it's okay," I said.

Yuki stood up. "What's that? Who are they?"

"I think they're researchers, Yuki," said Neve.

"BEARS!" yelled a researcher, eyes wide. "Dr. Shepherd, are you seeing what I'm seeing? We haven't seen polar bears in *forever*!"

"I know, Dr. O'Connell!" said another researcher. "This is such a rare sighting, since their habitat is being threatened by global warming. Sea ice is melting, and most polar bears are starving!"

"These three don't seem to have been affected yet. Lucky."

"We'd better go. Leave them in peace so they can hunt. It's going to be tough enough to find food as it is. We don't want to interfere."

Dr. Shepherd and Dr. O'Connell walked back into their orange machine, which took off into the sky.

"Weird," said Neve thoughtfully, before taking a big bite of one of Yuki's seals.

Dear Diary, 2

This is weird.

Yuki was seal hunting for twelve hours, but didn't come up with a single seal.

Neve and I joined in, but still we couldn't find any!

Finally, hungry and tired, we regrouped in the center of the ice sheet.

"No seals," murmured Neve. "This is crazy. How have all the other polar bears been surviving?"

"Um… Neve…?" It was Yuki, raising a tentative paw in the air. "When was the last time we *saw* any other polar bears?"

Neve scoffed. "When we saw Isolde and Eirwin! Do you not remember that, Yuki?"

"Neve," I cut in. "That was last year."

Neve's face turned white. I mean, I know his fur is *already* white, but it turned whiter. "Oh no. Ohhh no. This can't be happening. THIS CAN'T BE HAPPENING!"

"*Breathe*, Neve," whispered Yuki. "Let's go back to hunting."

We were about an hour into hunting when a large *KER-CRACK* was heard. Yuki yelped and started running. "Neve! Havaska!"

"Yuki, stay over there!" Neve yelled, staring at the ice. "It's not going to hold!"

Yuki kept running. "HAVASKA! NEVE!"

KER-CRACK! The ice split in two. Yuki skidded to a halt as the crack widened. Before long, there was an impassable gap.

"I'm going to swim for it," said Yuki.

"NO!" yelled Neve. "LOOK!"

I glimpsed the telltale coloring of an orca lurking under the surface of the water.

"YUKI!" I screamed, running to the edge of the ice sheet. "YUKI!"

"HAVASKA!" Yuki was crying now, sitting on the edge of the ice.

Neve nudged me. "We can't stay here forever."

"But Yuki!" I was sobbing now, reaching for Yuki across the gap.

"Listen, Havaska. We can't stay here forever. We have to go hunt. So does Yuki."

"Are you suggesting we leave her?" I couldn't believe what I was hearing. Neve wanted to leave Yuki alone!

"I am, Havaska. Yuki's a smart polar bear. She'll be fine."

Yuki nodded. "I'll be fine," she echoed, but it sounded like she was trying to convince herself.

With shaking paws, I allowed Neve to lead me further inland.

Dear Diary, 3

I didn't think it could get worse, but IT GOT WORSE!

Neve and I had been on our own for a while. We had to swim across an open strait of water for what felt like *forever*, until we finally found more ice. I was terrified because I didn't know if and when an orca would pop up next.

I don't think I've eaten a seal in weeks, Diary. I'm *starving*.

Neve's as skinny as I've ever seen him. He looked miserable, but he kept pressing on.

We were looking for more seals when we heard the dreaded sound.

KER-CRACK!

"NO!" yelped Neve. We had been on opposite sides of the ice sheet, hunting. We ran towards each other, but we were too slow.

The crack separated us, and by the time we were close enough, it was widening rapidly.

Too big to jump.

"NEVE!" I yelled, scanning the crack. No spot was small enough to jump. And I couldn't swim, because there was another orca in the crack, waiting for us to fall into its trap.

"Havaska, it'll be okay." Classic Neve, staying calm. "We both know how to hunt. We'll be fine."

"But—"

"Havaska. Stay calm. We'll be fine."

"We'll be fine," I whispered, watching Neve walk away. I had never been on my own before, but I had to go my own way.

Leaving Neve behind, I continued my journey, hoping to find food before it was too late.

Conclusion

- The purpose of this experiment was to determine which story would change people's opinions more: a fiction story or a nonfiction story.
- My hypothesis stated that a fiction story would change people's opinions more than a nonfiction story because fiction stories are more emotional and can influence people's thoughts, feelings, and opinions.
- My hypothesis was rejected because the nonfiction group had more opinion changes. In the nonfiction group, 28.7% of their opinions changed, while in the fiction group, 24.7% of their opinions changed. This is a small difference (only 4%), so the results were very close.
- From this experiment, I learned that both fiction stories and nonfiction stories can sway people's opinions on a topic. However, I learned that nonfiction stories influence a greater change in opinion, especially in children under 18.

Application

- This project is important to anyone interested in changing people's opinions on a topic. Politicians, business leaders, charities, teachers, and even parents can use these results to determine the best way to change people's opinions.
- This project is also important to me because I'm an author and I want to know how I can use stories to change my readers' opinions on crucial topics.
- If I were to repeat this experiment, I would choose a different topic. The topic I chose was climate change and global warming. However, almost all of the volunteers had prior knowledge on this topic and agreed that global warming is a serious issue. If I did this experiment again, I would choose a topic that the volunteers did not know as much about or held a different opinion about and see if I could sway their opinion in a certain direction.
- Another thing I would change is I would make sure the stories were the same length since the fiction story was 719 words longer than the nonfiction story.
- To add to this experiment, I would add a space in the survey for participants to write about how their opinions changed based on the story, because the questions might not adequately reflect their changing opinion.

Acknowledgements

- I would like to thank my mom for helping me stay on track and for sending the form out to the volunteers. She also helped me spend many a night working on this project.
- I would like to thank my dad for helping me figure out how to graph my raw data in a way that allowed me to easily conduct data analysis.
- I would like to thank my volunteers for taking the time to fill out my Google Form. Your role in this project was invaluable!