Does future framing affect people's contribution to climate change mitigation? Evidence from an online experiment

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Outline

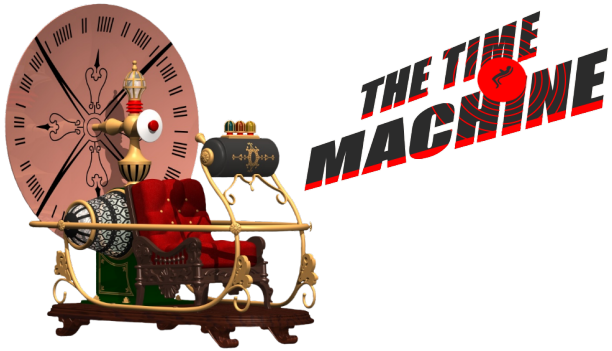
Motivation

Figure: Greta Thunberg: Friday for future

Source: Internet

- How to help people avoid short-sightedness and increase their concern for the future?

Mechanisms



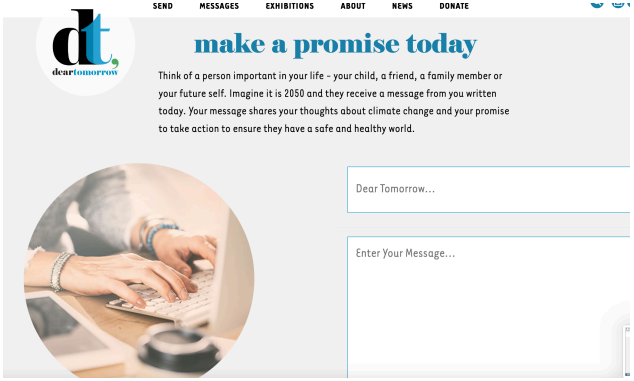


Figure: IFG, ITF, and LFG

Source: Hara et al. (2019) and Internet

Research questions: 1. Do the mechanisms work in other context?

2. What are the channels? Emotion?

Literature review about future design

- Future design: "Imaginary future generation" (IFG) (Kamijo et al. (2017); Saijo (2020));
- "Future ahead and back"(FAB) (Shahrier et al. (2017));
- Imagined trip to the future (ITF)(Shaw (2021); Qin et al. (2024));
- Letter to the future generation (LFG) (Shrum (2021)).

Theoretical framework

- Psychological distance (Trope and Liberman (2010));
- Time, space, social, and hypotheticality.

Source: Internet

Experimental design

- Treatment groups: FAB, ITF, LFG;
- Pilot study and power analysis;
- Experimental procedure:
  1. Background information about climate change;
  2. Treatment;
  3. Donation to Institute for Public Environment (IPE);
  4. Discount rate elicitation;
  5. Survey: socioeconomic characteristics and climate attitudes.

ITF treatment

- Where are you?
- What's the weather look like? Is it affected by climate change?
- Take a deep breath and feel the air you take, how do you feel?
- Take a look around, what does your surrounding environment look like?
- What are the fuels of transportation tools?
- What are the hot topics discussed on the Internet today?
- What are the expressions of the pedestrians around you? Which one is the most frequent?

FAB treatment

- Imagine you are traveling to 2060 and write a short essay about their life;
- Make a request to the current generation for donation on behalf of the future generation.
- Return to the present and make a donation as the current generation.

LFG treatment

- Ask respondents if they have children, nephews/nieces, or grandchildren;
- If yes, write a letter to them who live in 2060 about the risk and impact of climate change, and what they have done to mitigate climate change;
- If no, write a letter to a child who is born today and lives in 2060.

Sample essay

In 2060, I was in Dongguan City, Guangdong Province, affected by climate change, and the outdoor weather was hot and humid, and I felt breathless and tightness when I left the air-conditioned room, and the outdoor air quality was very poor. There was smog in the morning, and the highway was closed. The surrounding environment is seriously polluted, and everyone's means of transportation are cars, and travel is also seriously congested. Today's hot topic of discussion on the Internet is the issue of global climate change, the earth can no longer withstand the toss, global warming has triggered a series of serious consequences, the area of forests is getting smaller and smaller, and the glaciers are melting. Most of the pedestrians on the road wore masks, and they had to wear masks because of the poor air quality, and they couldn't see their expressions clearly, but most of them were frowning and depressed.

Sample Letter

"Dear children, as I write this letter, in 2023, I want to tell you that I foresee the risks and challenges of climate change, and I am well aware of how this will affect your lives in 2060. I am writing this letter in the hope that there will be some time in your busy lives to pause and reflect on this issue and the actions we are taking to stop climate change. First of all, I have to tell you that climate change is real. It is impacting our environment, our food supply chain, and even our health. I understand that this may be a difficult fact for you to accept, but we must face this problem squarely in order to find a solution. In the time I live in, we have already begun to take action to combat climate change. We have started to reduce the use of fossil fuels and promote renewable energy sources such as solar and wind. We have also taken a number of steps to reduce carbon emissions, such as investing in public transport and encouraging walking and cycling. However, this is not enough. We need more innovation and broader collaboration to address this issue....."

Discount rate elicitation

Numbering	Amount after 1 week (A)	Amount after 1 month (B)	Your choice (tick A or B)	
1	100	100	A	B
2	100	101	A	B
3	100	102	A	B
4	100	103	A	B
5	100	104	A	B
6	100	105	A	B
7	100	106	A	B
8	100	107	A	B
9	100	108	A	B
10	100	109	A	B
11	100	110	A	B
12	100	111	A	B
13	100	112	A	B
14	100	113	A	B
15	100	114	A	B
16	100	115	A	B
17	100	116	A	B
18	100	117	A	B
19	100	118	A	B
20	100	119	A	B

Figure: Discount rate elicitation decision table

Empirical model

$Y_i = \alpha + \beta_1 FAB + \beta_2 ITF + \beta_3 LFG + \gamma \boldsymbol{X_i} + \epsilon_i$

where Y_i are participants' donations;

FAB, IFT, and LFG are dummies for one of the three treatment groups;

$\boldsymbol{X_i}$ is a vector of socioeconomic characteristics and climate change attitudes;

ϵ_i is an error term.

Treatment effect

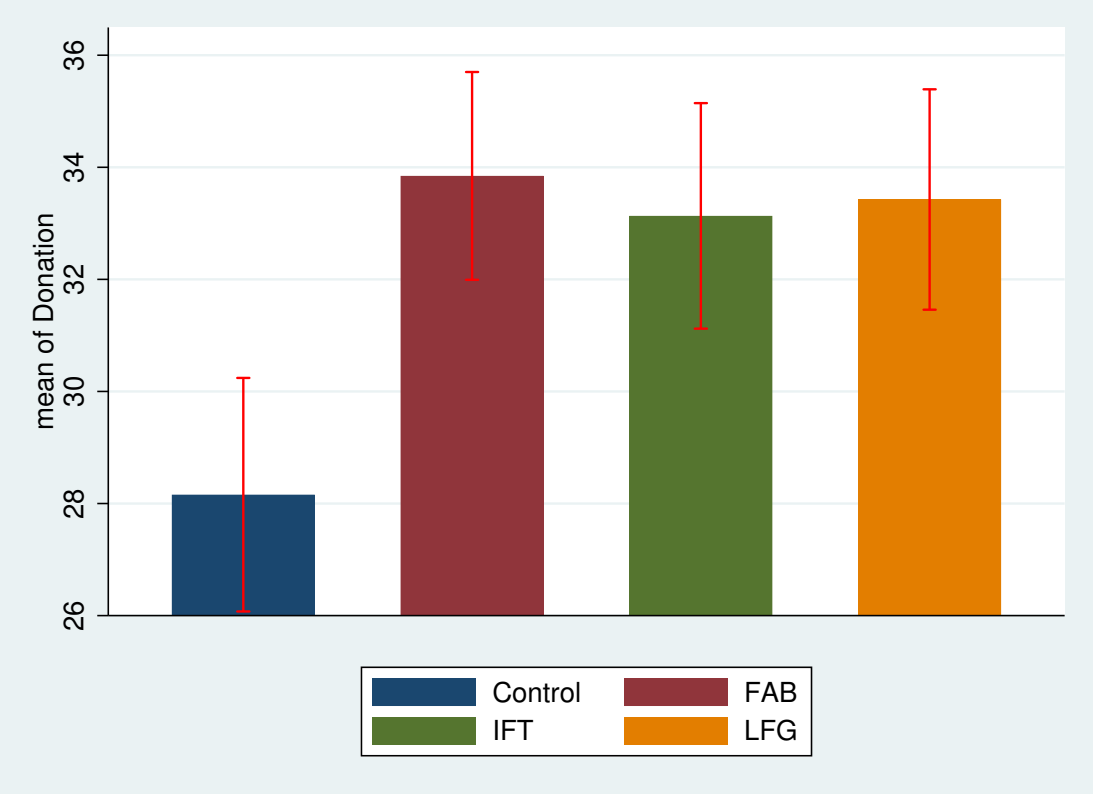


Figure: Box-plot of the donation by treatment group

Regression analysis of the factors that affect donations

VARIABLES	(1) Donation	(2) Donation	(3) Donation
D1(FAB)	5.689***	4.880***	5.730***
	(1.421)	(1.399)	(1.356)
D2(ITF)	4.975***	4.104***	4.384***
	(1.476)	(1.450)	(1.417)
D3(LFG)	5.267***	4.048***	4.144***
	(1.460)	(1.431)	(1.412)
Future_equivalent		0.0638	0.0299
		(0.0730)	(0.0708)
Education		2.661***	2.153**
		(0.985)	(0.944)
Size		1.643***	1.520***
		(0.502)	(0.490)
Environattitude		5.854***	3.489***
		(0.904)	(0.961)
Humancause			1.380***
			(0.475)
Intent-to-donate			1.508***
			(0.460)
Pay-for-future-generation			0.929*
			(0.500)
Constant	28.16***	-14.09	-30.93***
	(1.062)	(10.04)	(11.40)
Observations	1,003	1,003	1,003
R-squared	0.020	0.083	0.145

Discount rate analysis

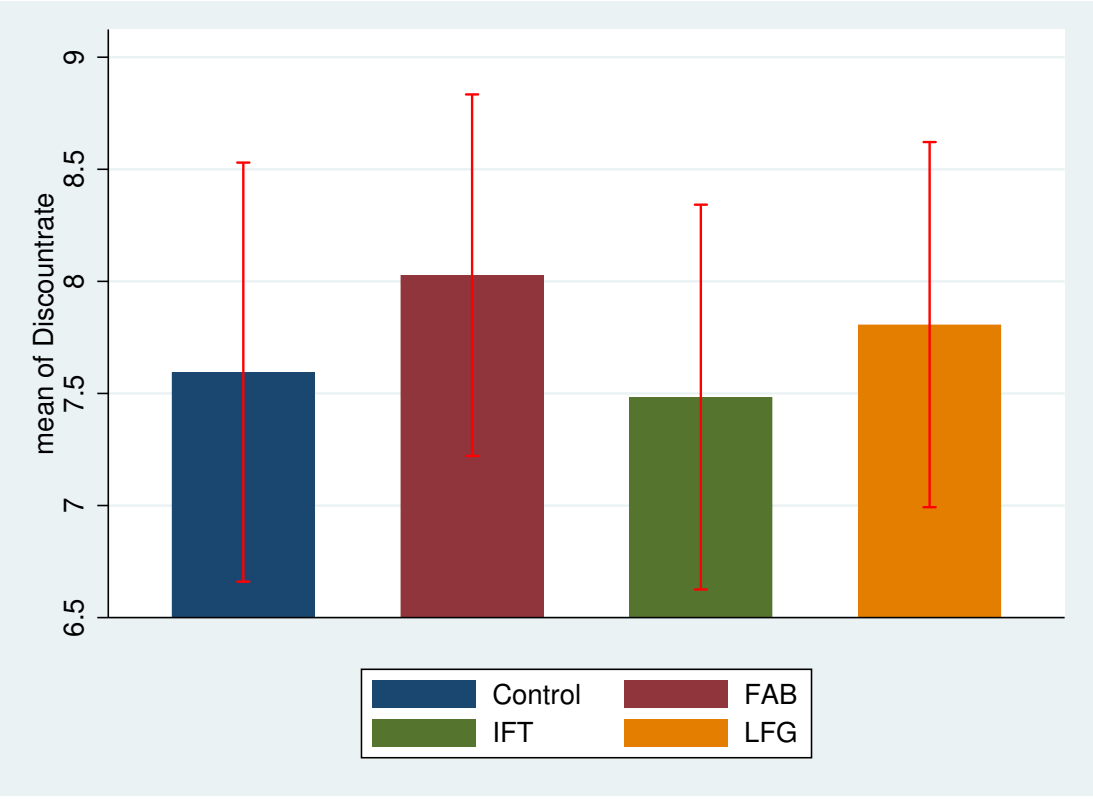


Figure: Box-plot of the discount rate upper bound by treatment group

Heterogeneous treatment effect

VARIABLES	(1) Donation	(2) Donation	(3) Donation	(4) Donation
D1(FAB)*Future$_{e}$*quivalent*	0.0528***			
	(0.0126)			
D2(ITF)*Future$_{e}$*quivalent*	0.0418***			
	(0.0130)			
D3(LFG)*Future$_{e}$*quivalent*	0.0378***			
	(0.0131)			
D1(FAB)*Harm-future-generation		0.937***		
		(0.214)		
D2(ITF)*Harm-future-generation		0.713***		
		(0.219)		
D3(LFG)*Harm-future-generation		0.670***		
		(0.219)		
D1(FAB)*Intergenerational-equality			0.995***	
			(0.236)	
D2(ITF)*Intergenerational-equality			0.714***	
			(0.248)	
D3(LFG)*Intergenerational-equality			0.628**	
			(0.245)	
D1(FAB)*Pay-for-future				0.966***
				(0.229)
D2(ITF)*Pay-for-future				0.755***
				(0.233)
D3(LFG)*Pay-for-future				0.756***
				(0.243)
Socioeconomic characteristics	Yes	Yes	Yes	Yes
Climate attitudes	Yes	Yes	Yes	Yes
Observations	1,003	1,003	1,003	1,003
R-squared	0.137	0.139	0.136	0.138

Heterogeneous treatment effect

VARIABLES	(1) Donation	(2) Donation	(3) Donation
D1*Income	1.458***		
	(0.390)		
D2*Income	1.085***		
	(0.390)		
D3*Income	1.117***		
	(0.397)		
D1*Education		1.508***	
		(0.339)	
D2*Education		1.214***	
		(0.351)	
D3*Education		1.140***	
		(0.355)	
D1*Size			1.515***
			(0.330)
D2*Size			1.171***
			(0.357)
D3*Size			1.018***
			(0.328)
Climate attitudes	Yes	Yes	Yes
Socioeconomic characteristics	Yes	Yes	Yes
Observations	1,003	1,003	1,003
R-squared	0.129	0.139	0.132

Mechanism: emotion

VARIABLES	(1) Donation	(2) Donation	(3) Donation
Care	1.555**	1.500**	1.446**
	(0.709)	(0.670)	(0.685)
Education		4.322**	3.809**
		(1.940)	(1.896)
Environmental attitudes		7.584***	6.409***
		(1.726)	(1.880)
Climate attitudes	NO	NO	YES
Constant	23.33***	-26.92***	-19.02*
	(4.744)	(10.04)	(10.99)
Observations	254	254	254
R-squared	0.017	0.135	0.152

Conclusion

- We find all three treatments significantly increase participants' donations;
- The treatment effects are larger when participants are more impatient, care more about future generations' welfare and inter-generational equity, richer, more educated, and have larger family size;
- The LFG treatment works by stimulating participants' care for their children's future.

Limitations and Future research

- Our online experiment has less controls than the lab or field experiment;
- We can only test the emotion channel by analyzing the essays and letters;
- Future research can use psychological scale measures to measure the emotion created by the mechanisms.

Thank you!

Any suggestions are welcome, please contact me at bqinecon@xjtu.edu.cn.

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