Intragenerational conflict undermines cooperation with the future

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Motivation

- Future generations: No freedom of choice and lack of agency
  (e.g. Sen, 1988; Gravel, 2004; Owens et al. 2014; Bartling et al. 2014; Neri and Rommeswinkel, 2014)
  They can't rely on bargaining, vote, punishment or other mechanisms
  (e.g. Fehr and Gächter, 2000, 2002; Masuda et al. 2014; Hauser et al. 2014)

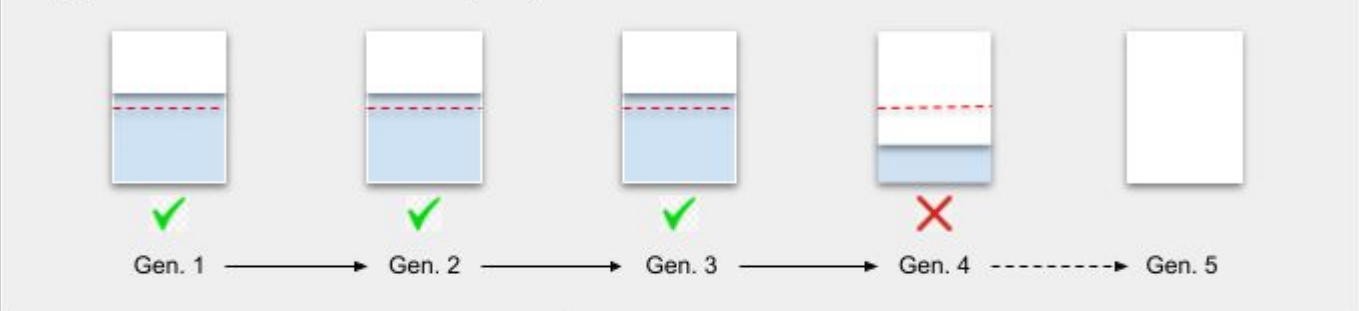
- Overexploitation of resources and underprovision of goods
  (e.g. Hardin, 1968; Dawes, 1980; Ostrom, 1990, 2010).

- Intergenerational social dilemmas
  (Chermak and Krause, 2002; Fischer et al. 2004; Hauser et al. 2014; Sherstyuk et al. 2016; Lohse and Waichman, 2020; Shahen et al. 2021; Chang et al. 2021; Escobar-Espinosa and Lordemann, 2022; Adjukovic et al. 2025)

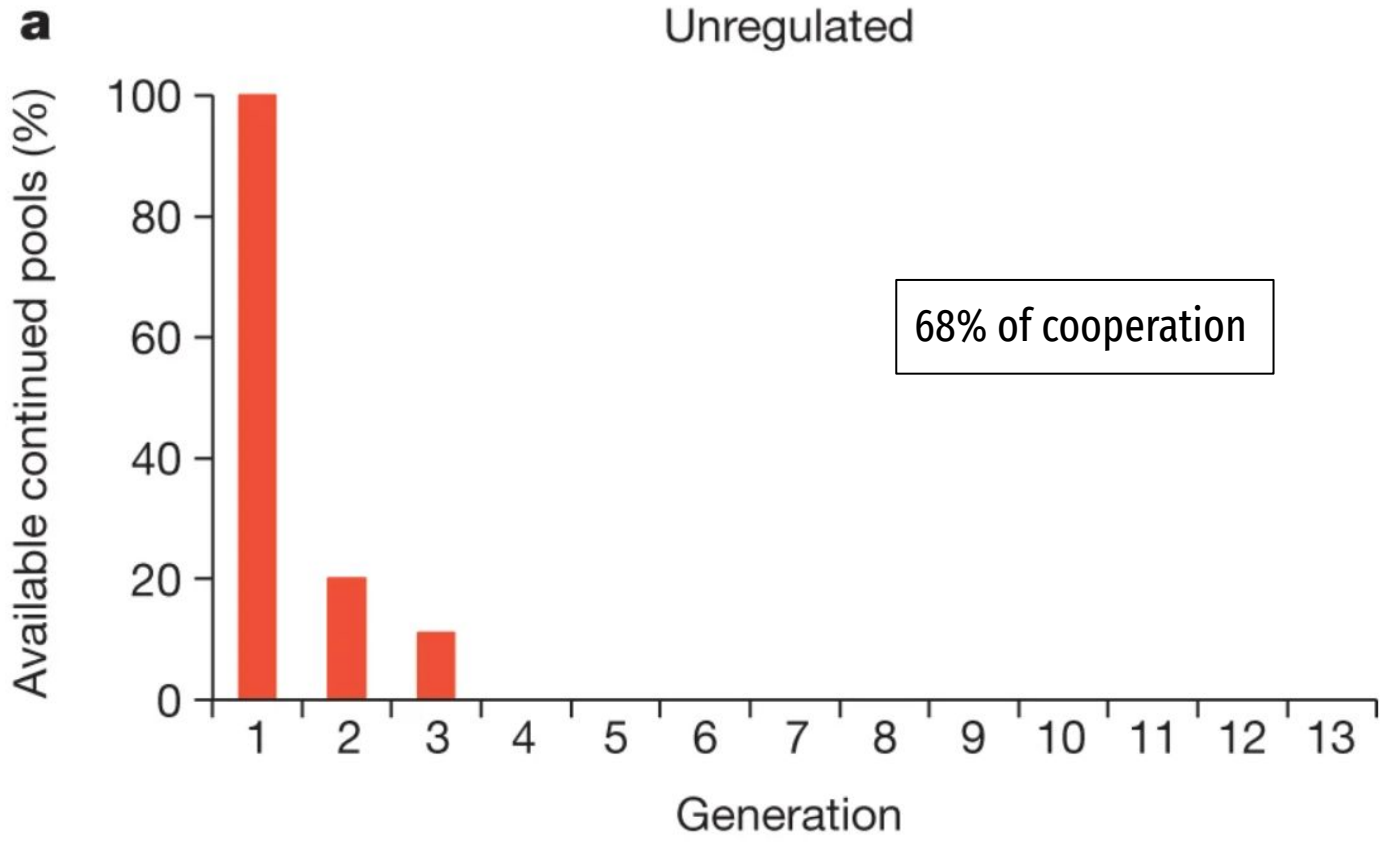
Intergenerational Good Game (Hauser et al. 2014, Nature)

The IGG takes source in two types of games

- Common pool resources game: intragenerational conflict
  (e.g. Walker et al. 1990, 1994, 2000; Cardenas and Ostrom, 2001; Cox and Stoddard, 2015)
- Threshold public good game: next state depends on a current threshold
  (e.g. Cadsby and Maynes, 1999; Croson and Marks, 2000; Bchir and Willinger, 2013)



Intergenerational Good Game (Hauser et al. 2014, Nature)



Conservation failures, why?

- Inter-generational conflict (Lack of consideration for the future, shortsightedness, social dilemma with the future)
  (Arrow et al. 2013; Jacquet et al., 2013)

or,

- Intra-generational conflict (rivalry, competition, social dilemma with the contemporaries)

or,

- Both

Context of the “Fête de la science”

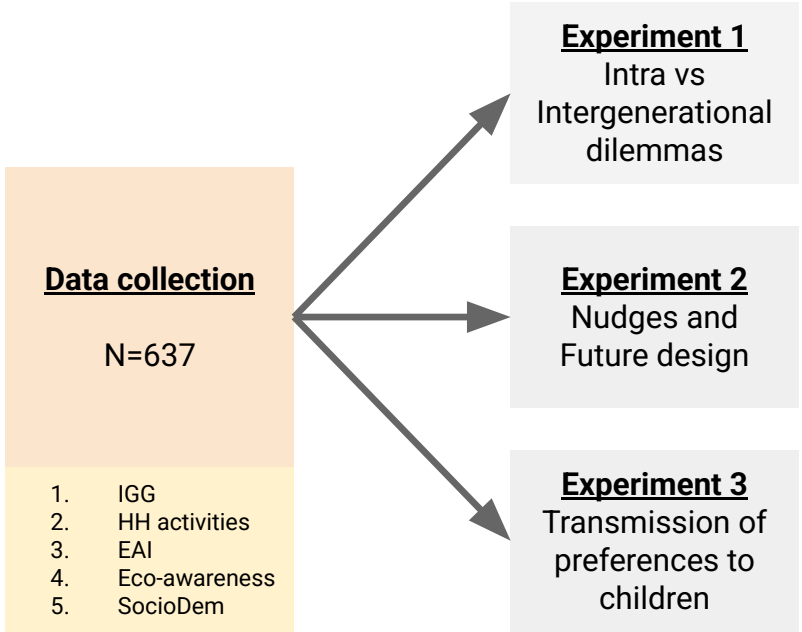
Setting

- National event with participants of all ages: mean 32.3yo (3-78) and 59% women
- Opportunity to gather data from the general population and families (parent–child pairs)
- 4 days of data collection

Constraints

- Participants arrive sequentially (no scheduling)
- Limited time per participant ≈ 10 minutes
- Participants are not accustomed to experiments
- Heterogeneous understanding across age and background

Overview

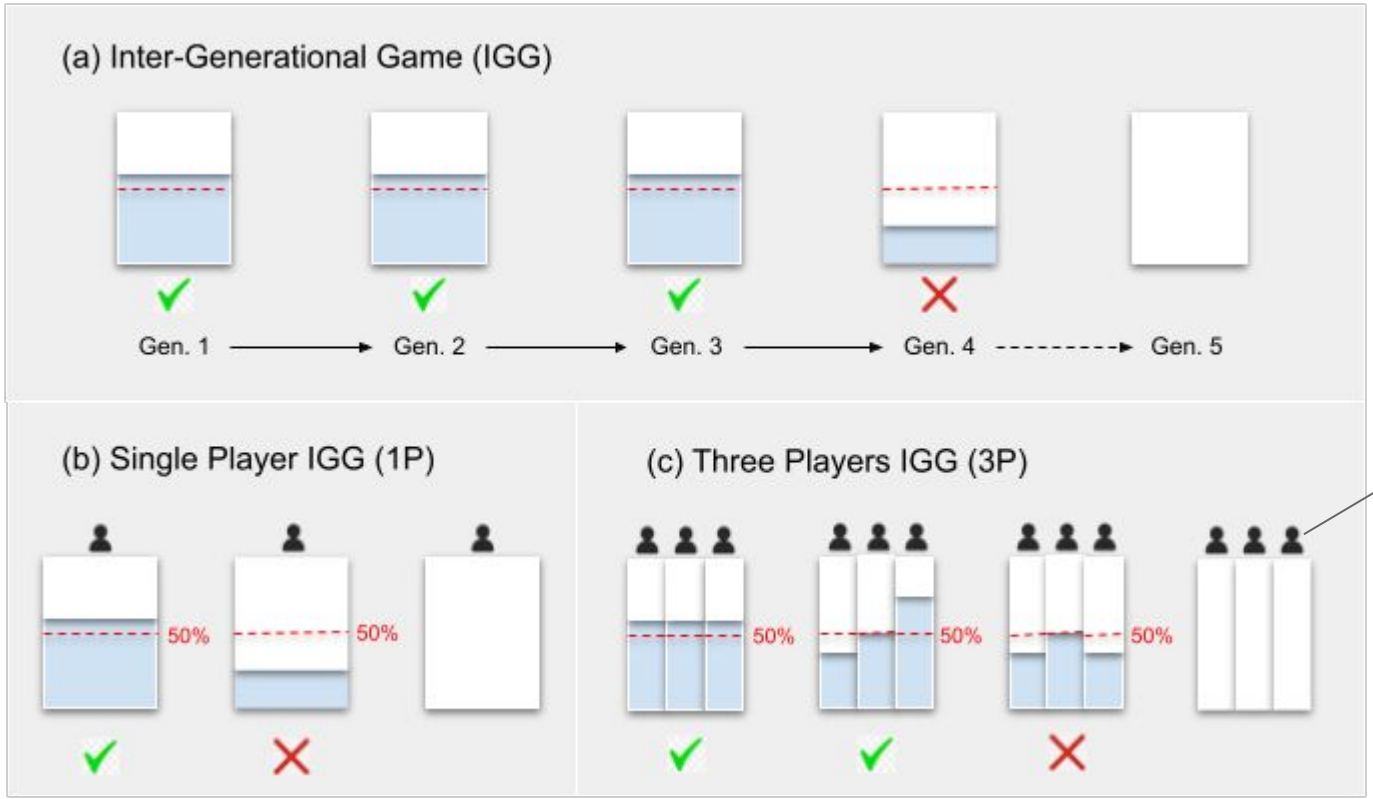


- Three studies (N=637)
- Ethical committee: July 2024
  Pre-registered on OSF: July 2024
  Conducted between: Sept. and Oct. 2024
- Data collected with general population in three events:
  “Fête de la science 2024”, “Nuit Européenne des Chercheuses” and “Festival Vas-Savoir ?!”
- We used a mobile lab (30 tablets) and welcomed subjects sequentially during the events.
- Mean duration: 12 minutes
- Mean payment: 3.58€*

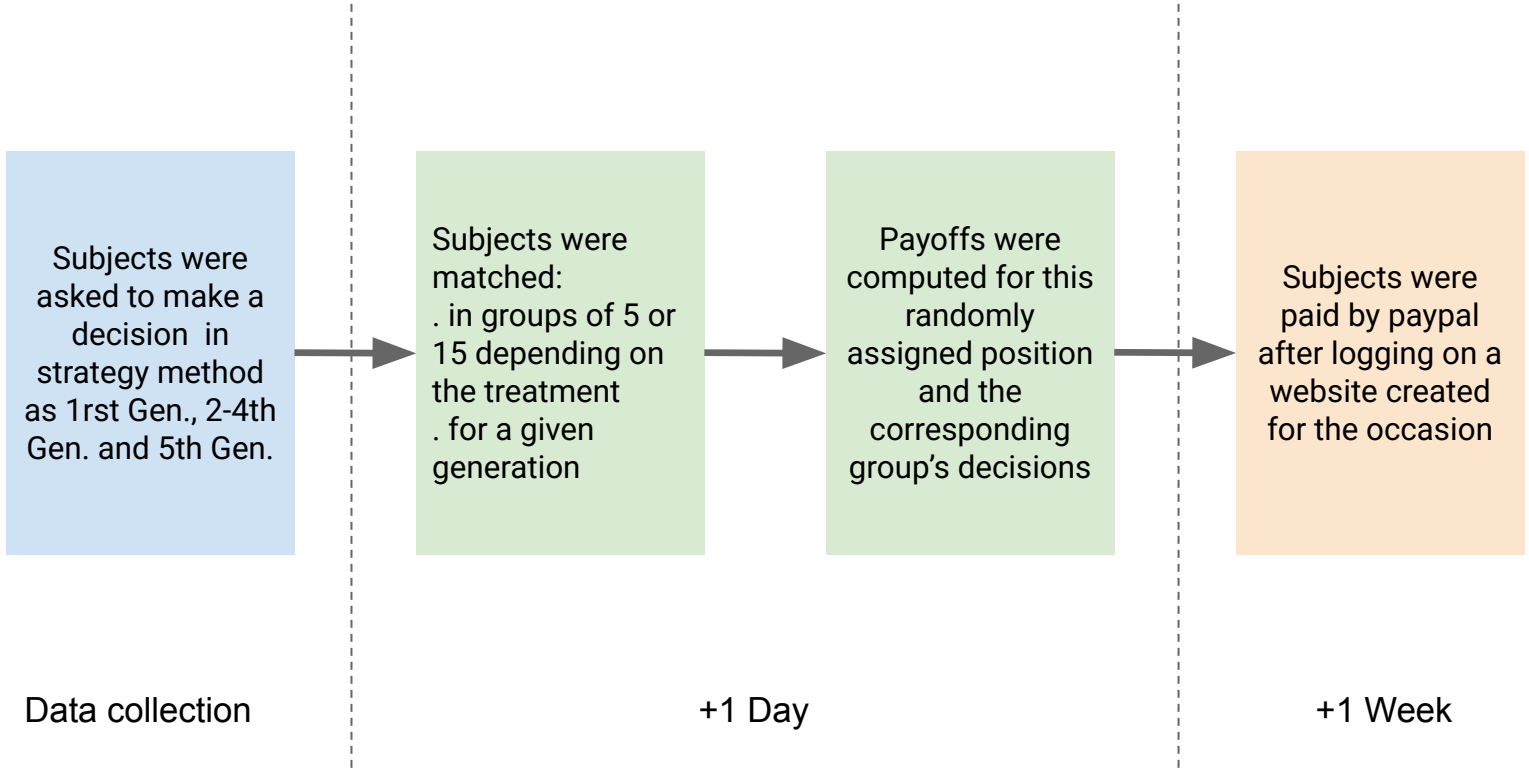
Simplified Intergenerational Good Game

- $n = 1$ or $n = 3$ $\quad g = \{1, 2, 3, 4, 5\}$
- $x_{i,g} \in \left[0, \frac{S_g}{n}\right]$ $\quad X_g = \sum_{i=1}^{n} x_{i,g}$
- $S_1 = 60$ $\quad T = \frac{S_1}{2} = 30$ $\quad S_{g+1} = \begin{cases} S_g, & \text{if } X_g \leq T \\ 0, & \text{if } X_g > T \end{cases}$

Experimental design



Matching procedure and payment



Overview

Data collection

n=260

N=637

1. IGG
2. HH activities
3. EAI
4. Eco-awareness
5. SocioDem

Experiment 1
Intra vs Intergenerational dilemmas

Experiment 2
Nudges and Future design

Experiment 3
Transmission of preferences to children

Treatment: n=1 or n=3 player(s) per generation

5 generations

Decisions are made in **strategy method** as 1rst Gen., 2-4th Gen. and 5th Gen.

Players are randomly drawn ex-post in a specific generation and are paid accordingly

Subjects are told that there is no 6th generation

Individual extraction capacity *when*
n=1 : 60
n=3 : 20

Hypothesis

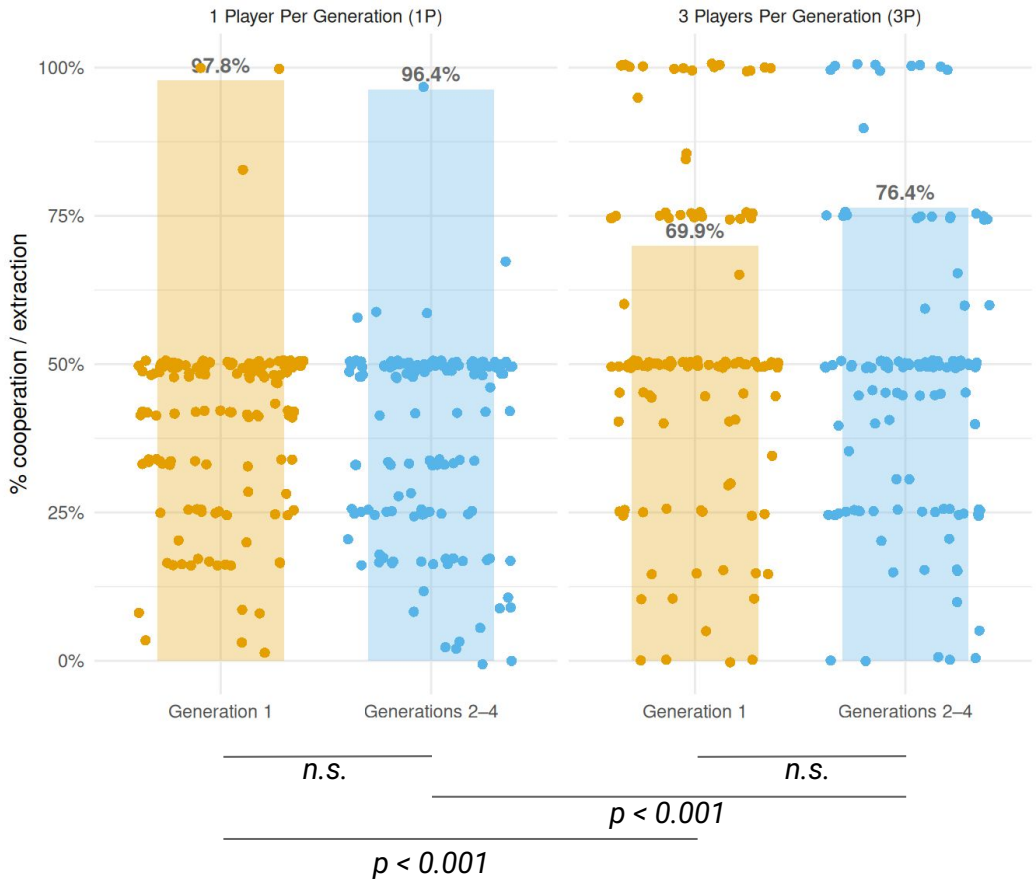
1P treatment: we expect behaviors similar to a dictator game

- A part of the players conserves the resource for the future generations (30)
- Others behave selfishly and extract everything (60)

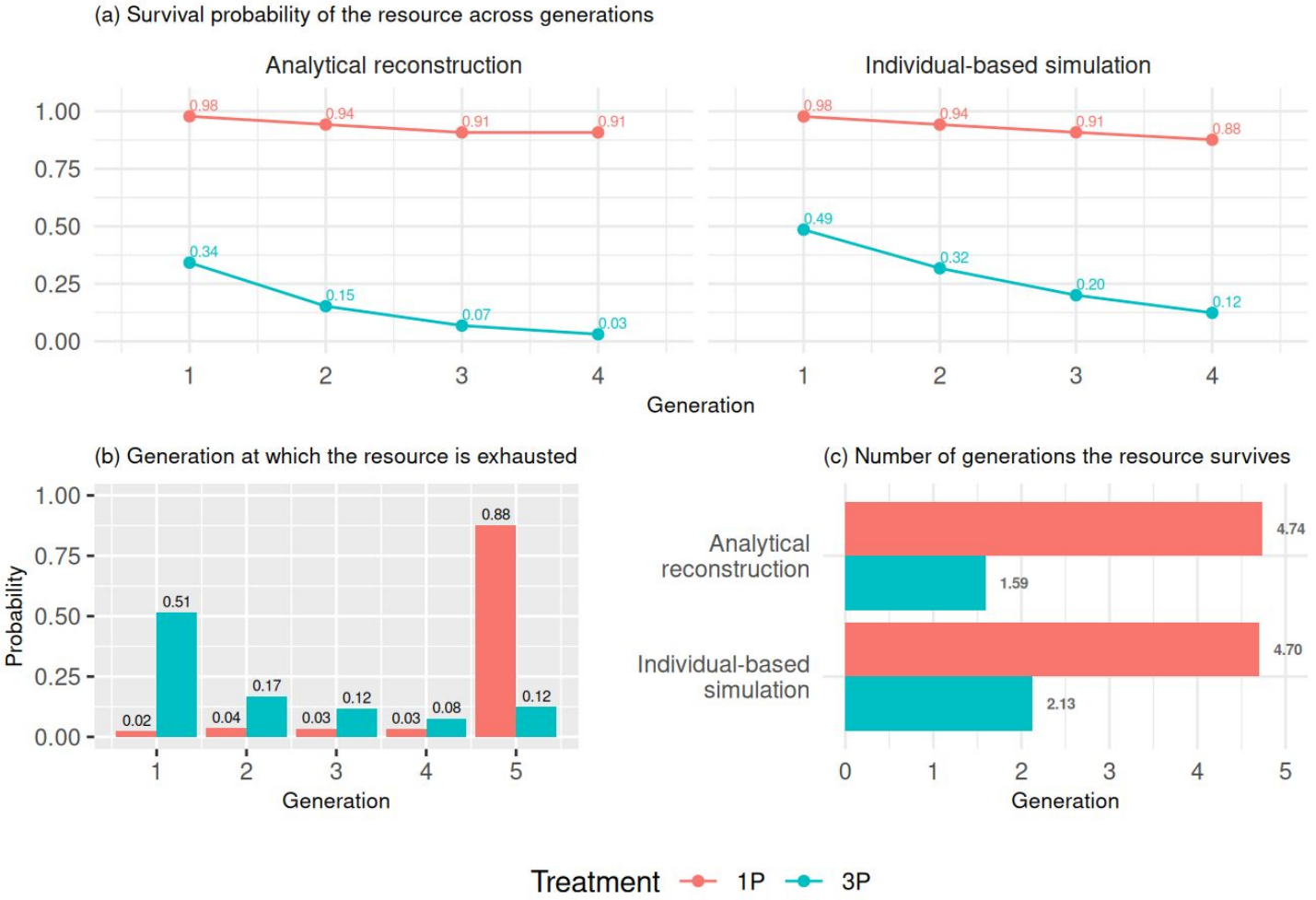
3P treatment: the intra-generational conflict increases the frequency of over-extraction and depletion of the resource

- Less players extracting (10)
- More players extracting (20)

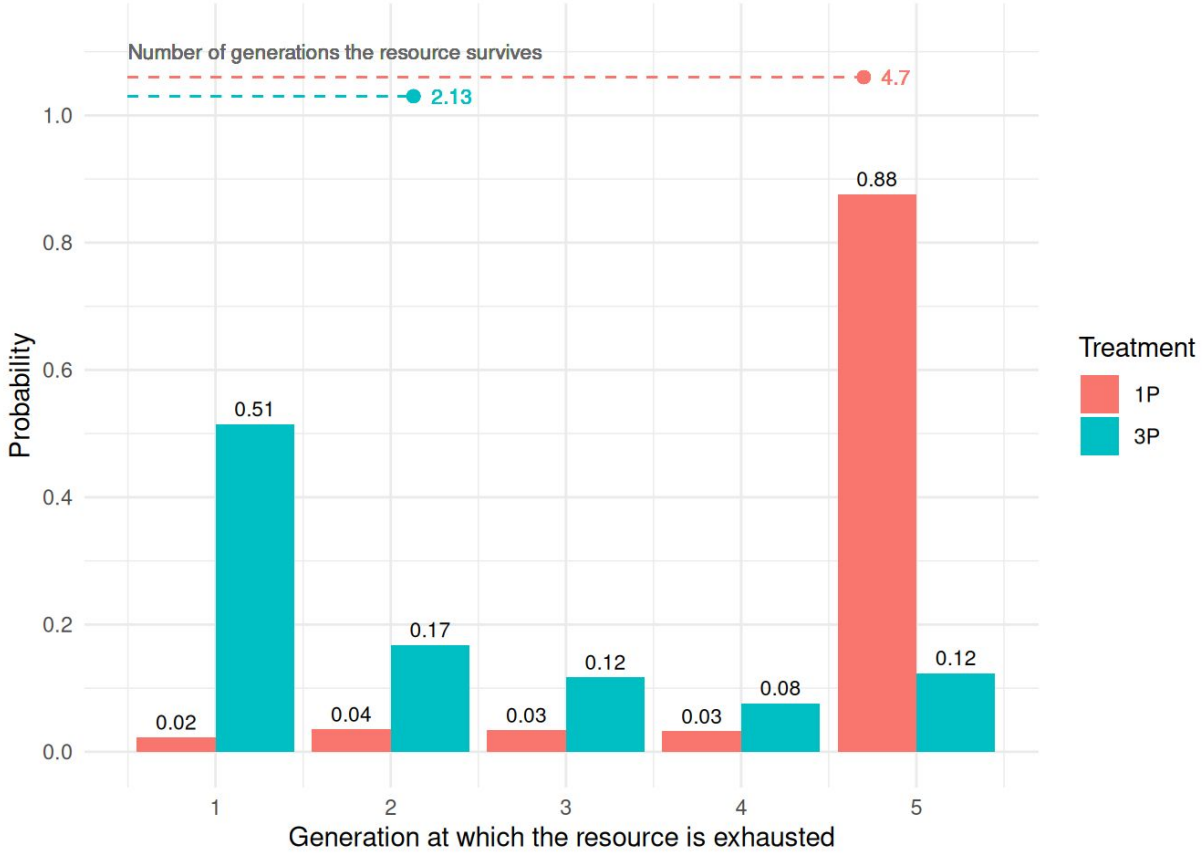
Intra- vs. Inter-generational



Resource survival (max=5)



Resource survival (max=5)



Results from experimental data

(1) 98% of the individuals are preserving the resource when there is no intra-generational conflict

(2) Introducing intra-generational conflict lead a large share of players to over-extract (30% vs 2%)

(3) A share of the population is under-extracting, offsetting a part of the over-extractions

(4) We find a similar cooperation rate in treatment with both inter and intragenerational dilemma than Hauser et al. (2014)

Theoretical framework (1 player)

(1) An instantaneous utility function including
- (i) *x* the player's extraction
- (ii) β a future-oriented preference (both altruism and discount)
- (iii) *p* the player's belief about contemporaries cooperation
- (iv) *V* the continuation utility (recursive utility of future generations)

$$u_{i,g} = \begin{cases} x_{i,g} + \beta_{i,g} \cdot p_{i,g} \cdot V_{g+1}, & \text{if } X_g \leq 30 \\ x_{i,g}, & \text{if } X_g > 30 \end{cases}$$

(2) In the 1P per generation treatment

$$u_C = 30\left(1 + \frac{\beta_g}{1-\beta_g}\right) = \frac{30}{1-\beta_g} \quad \text{VS.} \quad u_D = 60$$

According to the model, subjects' behaviors can be explained by a large enough future-oriented preference

Theoretical framework (3 players)

(3) In the 3P per generation treatment

(i) parameter *p* is function of the believed distance to the sustainability threshold

$$z = 30 - \mathbb{E}[X_{-i,g}]$$

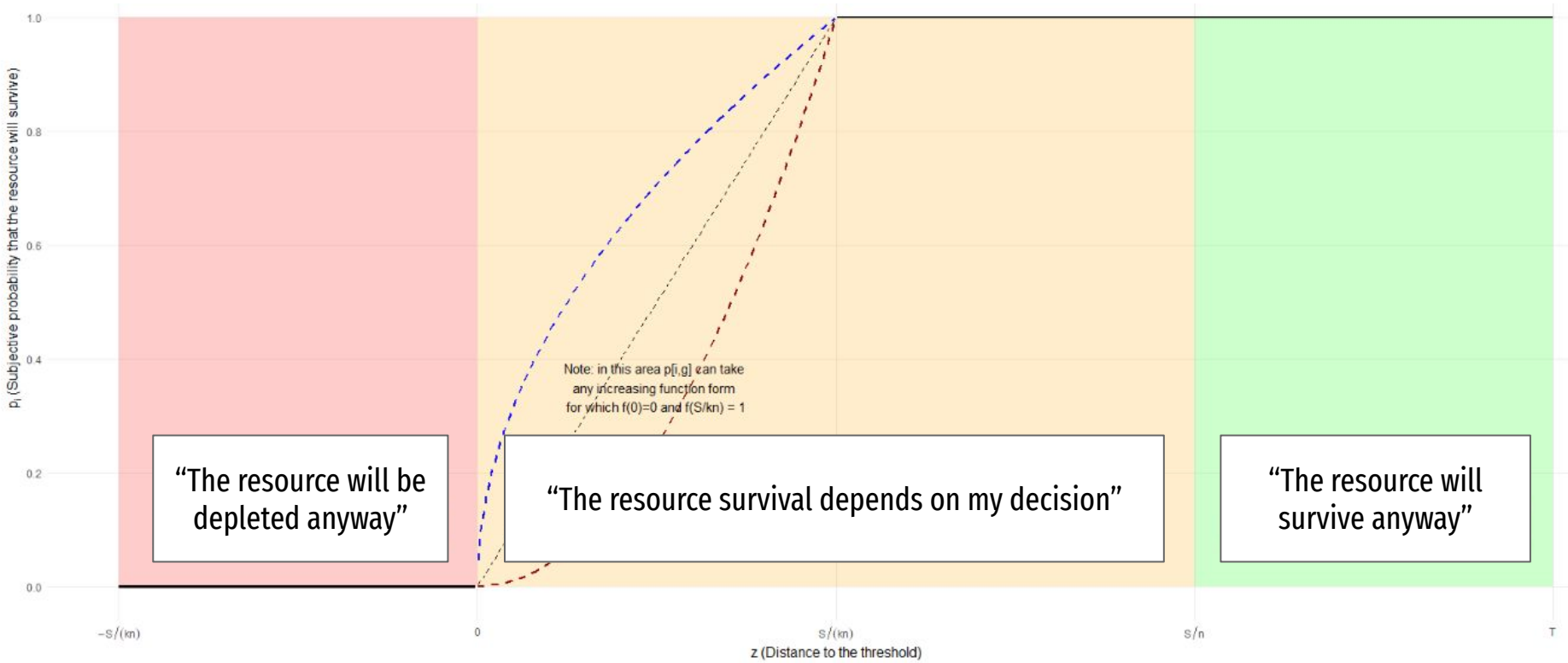
(ii) *p* is defined as a bounded and increasing function mapping the perceived sustainability to the subjective probability that the resource survives to generation *g+1*

$$\phi(z,\alpha) = \begin{cases} 1, & \text{if } z \geq 20 \\ f(z,\alpha), & \text{if } 0 \leq z < 20 \\ 0, & \text{if } z < 0 \end{cases} \quad \text{with } \alpha > 0,$$

(iii) f(.) concave reflects a more forgiving player, convex a more rigid player

e.g. $f(\tilde{z}) = \tilde{z}^{\alpha}$

Mapping of perceived sustainability



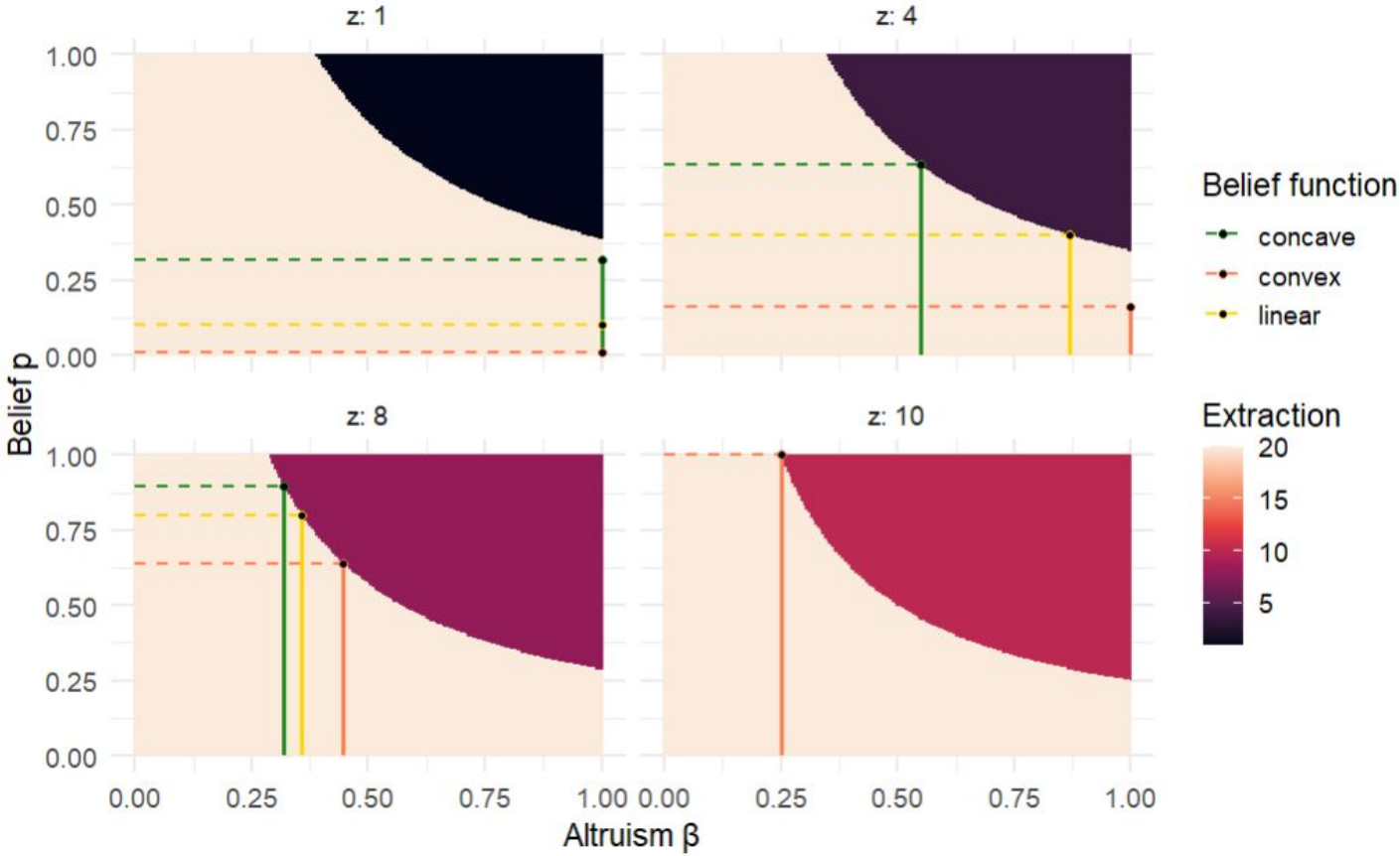
Decision to make an additional effort (sacrifice)

(3) In the 3P per generation treatment

$$\beta_i p_i \geq \frac{20 - z}{50 - z}$$

Player's decision to adopt a conservation strategy depends on both her future oriented preference and her beliefs about others' behaviors

Decision to make a sacrifice (underextraction)



Wrap-up

Short-sightedness and lack of intergenerational altruism do not explain the conservation failure

Intragenerational conflicts are the main driver of depletion

It questions present-oriented vs. future-oriented mechanism design

We suggest (to be experimentally tested):

(i) That individuals have future-oriented preferences
(ii) These altruistic preferences are mitigated by beliefs about contemporaries
(iii) These beliefs are biased toward selfishness (as found e.g. in Cohn et al. 2019)

Implications for mechanisms and policies

- Intergenerational social preferences (updating beliefs about others)
  (Inoue et al. 2021; Inoue et al. 2022; Rodriguez-Lara and Ponti, 2017; Rhode et al. 2022; Kölle and Wenner, 2023)

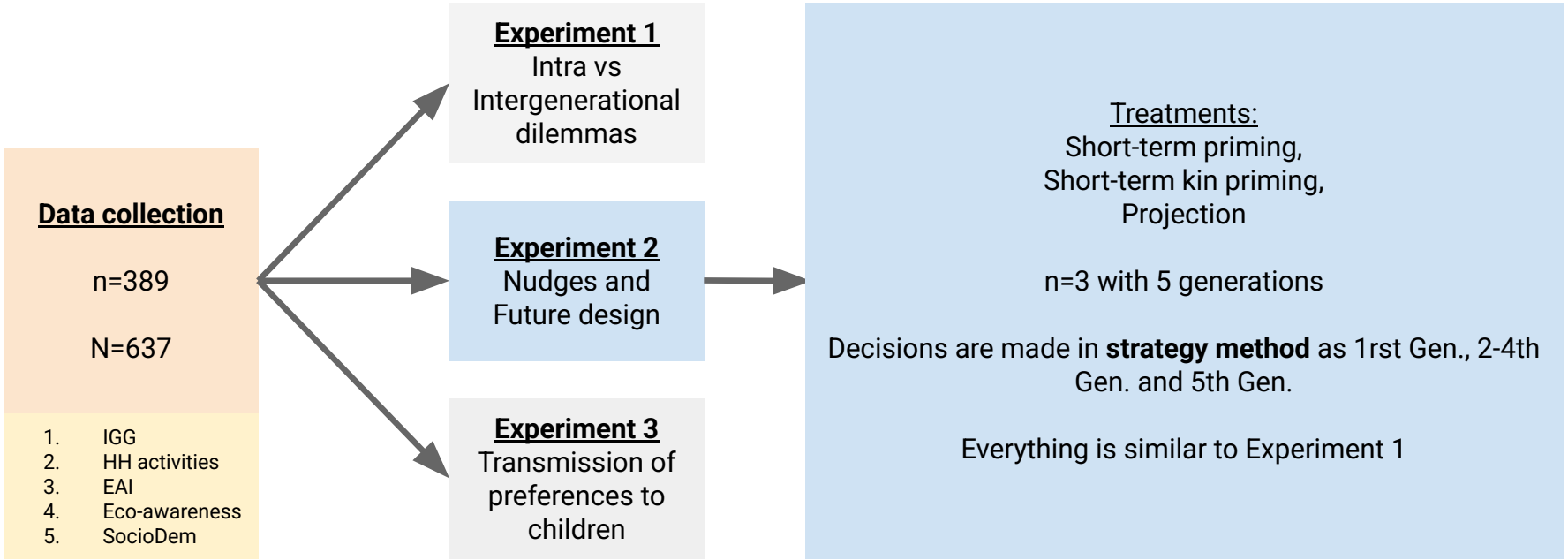
- Future-oriented mechanisms: Social learning and Future design
  (Jackson and Kalai, 1997; Schotter and Sopher, 2003; Chaudhuri et al. 2006; Grolleau et al. 2016; Kamijo et al. 2017; Shahrier et al. 2017, Saijo, 2020, Farjam and Wolf, 2021, Timilsina et al. 2021, 2022; Adjukovic et al. 2025)

- Mechanisms to solve intragenerational conflicts are relevant
  e.g. intra-generational punishment, voting, bargaining
  (e.g. Fehr and Gächter, 2000, 2002; Masuda et al. 2014; Hauser et al. 2014, Bayle et al. 2024, 2025)

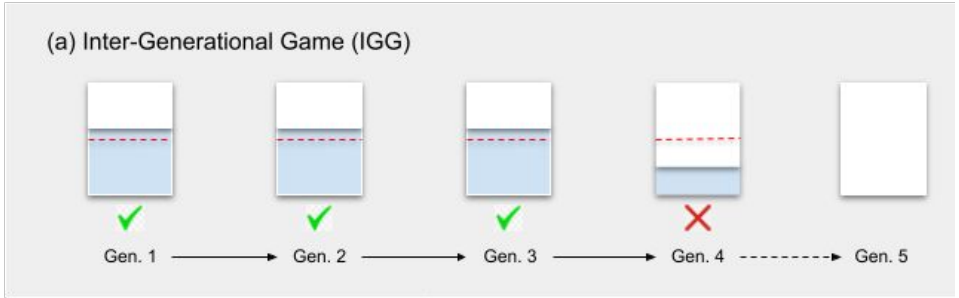
Extensions

- Replicate in a controlled environment
- Elicit beliefs to test the two theoretical frameworks
- Disentangle drivers behind extreme future-oriented preferences

Overview


Data collection
n=389
N=637
1. IGG
2. HH activities
3. EAI
4. Eco-awareness
5. SocioDem
Experiment 1
Intra vs Intergenerational dilemmas
Experiment 2
Nudges and Future design
Experiment 3
Transmission of preferences to children
Treatments:
Short-term priming,
Short-term kin priming,
Projection
n=3 with 5 generations
Decisions are made in strategy method as 1rst Gen., 2-4th Gen. and 5th Gen.
Everything is similar to Experiment 1

Experimental design



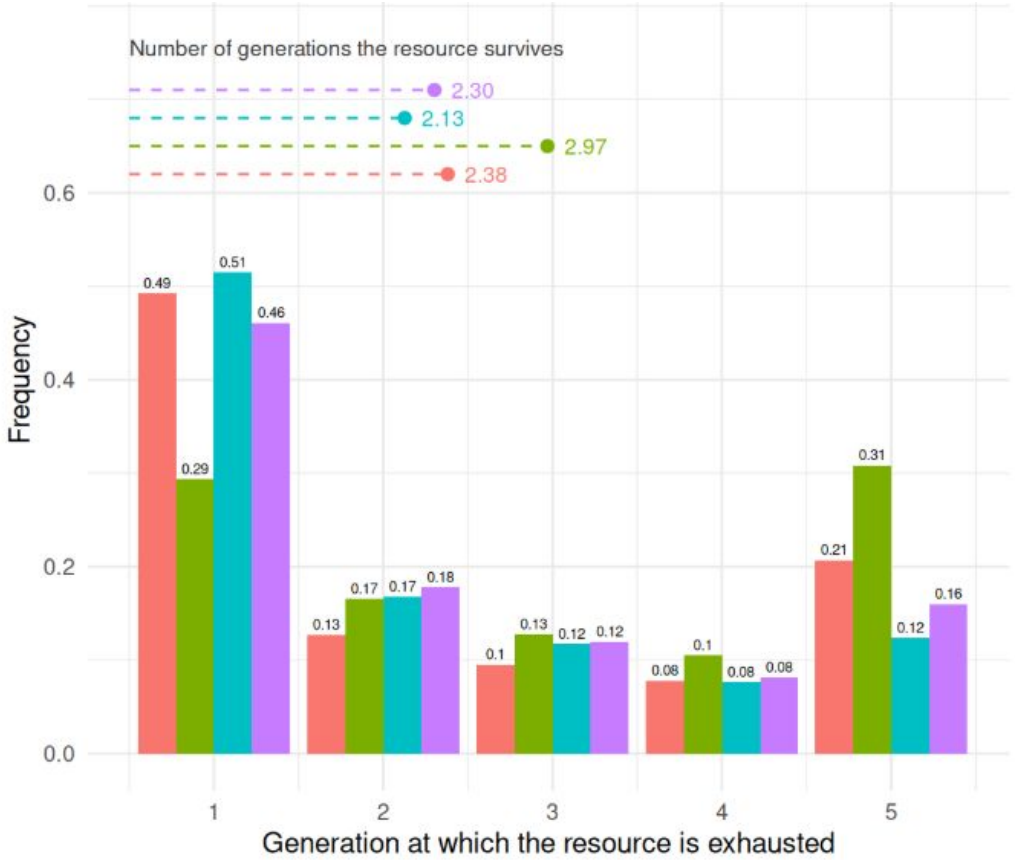
Priming treatments:

"Les ressources communes, telles que les poissons ou les forêts, sont renouvelables, mais peuvent s'épuiser si elles ne sont pas gérées de manière durable. Lorsque nous prélevons une quantité excessive de ces ressources, elles n'ont pas le temps de se régénérer et risquent de disparaître définitivement.
(NEXTGEN) *Adopter des pratiques responsables permet de préserver ces ressources précieuses pour les générations suivantes.*
(KIN) *Adopter des pratiques responsables permet de préserver ces ressources précieuses pour votre descendance."*

Projection treatment (Shahen et al., 2021):

"Vous ignorez à quelle génération vous appartenez, mais nous vous demandons de vous mettre à la place de la dernière génération. Combien d'unités de ressource souhaiteriez-vous que les générations précédentes décident d'extraire (entre 0 et 60 unités) ?"

Results



Treatments	Cooperation rates
Kin	70.0 %
Nextgen	82.4 % (p<0.01)
Baseline	70.0 %
Projection	77.5 %

We made power analysis to detect changes of 20% with a power of 80% and a significance threshold of 0.05

Overview

Data collection

parents=120
kids=140

N=637

1. IGG
2. HH activities
3. EAI
4. Eco-awareness
5. SocioDem

Experiment 1
Intra vs Intergenerational dilemmas

Experiment 2
Nudges and Future design

Experiment 3
Transmission of preferences to children

Treatments:
Children and Adults (family-paired)

n=1 with 5 generations

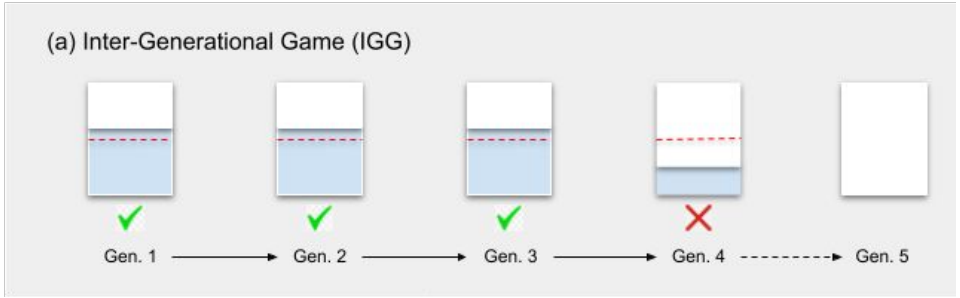
For children (10+) and adults, decisions are made in **strategy method** as 1rst Gen., 2-4th Gen. and 5th Gen.

For children (3-9), decisions are made **only once**.

Matching with family numbers.

Everything is similar to Experiment 1.

Experimental design



For adults or teenagers (10+)

For kids (3-9)

Conclusion

Short-sightedness and lack of intergenerational altruism do not explain the conservation failure

Intragenerational conflicts are the main driver of depletion

Future generation priming reduces over-extraction
Descendants priming is not

- A possible explanation is that the inclusivity of all future individuals is relevant

We lack power to conclude about Projection design

Thank you for your attention!