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# Is patience malleable via educational intervention? For all, for youth only? Evidence from field experiments

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# Patience is an important individual preference

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**Patience** (i.e., small individual time discounting factor) is important from both a micro- and a macroeconomic perspective

- Patience is associated with more savings and better health and education at the **micro** level (Sutter et al. 2018, *AER*; Falk et al. 2018, *QJE*)
- Aggregate patience is positively correlated with country incomes, i.e. at the **macro** level (Hanushek et al. 2022, *EJ*; Sunde et al. 2022, *REStud*)

➔ Can policy do anything about patience as a preference?

# Preferences seem to be malleable

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- Neoclassical models assume **preferences to be stable** “deep” parameters which are considered invariant to policy interventions (e.g., Stigler and Becker 1977, AER)
- In contrast, recent literature questions the stability of preferences across time and contexts (e.g., Malmendier and Nagel 2011, QJE; Callen et al. 2014, AER; Hanaoka et al. 2018, AEJ: Applied; Mata et al. 2018, JEP; Schildberg-Hörisch 2018, JEP)
- Emerging literature on causal **effects of educational interventions on preferences** for children and youth
  - Risk preferences (e.g., Sutter et al. 2020)
  - Time preferences (e.g., Alan and Ertac 2018, JPE; Lührmann et al. 2018, AEJ: Applied)
  - Social preferences (e.g., Cappelen et al. 2020, JPE; Kosse et al. 2020, JPE)

→ Are treatment effects limited to earlier years in the life cycle?

# Can financial education impact patience?

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- Financial education is effective wrt improving financial behavior
  - A core outcome, that works well is increasing **savings/investments**
  - One **channel** in doing so is financial **knowledge**
  - However, there are other effects:
    - financial behavior can improve without increasing knowledge
    - Effects of behavioral change can be long-lasting (while knowledge typically disappears over time)
  - These effects can be explained by fin edu changing **preferences**, such as possibly improving patience.
- ➔ Can financial education improve patience? **For all, for the young?**

## We conduct an RCT and a (small) meta-analysis

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- 1) We conduct an **RCT studying the effects of a financial education intervention** on time-preferences of both youth and adults in Uganda using the established CTB protocol ([Andreoni and Sprenger 2012, AER](#)).
- 2) We conduct a **meta-analysis of 9 earlier field experiments** studying the causal effects of (financial-) education interventions on impatience measured in incentivized tasks.

## Result: Fin. education improves patience of the young

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Own field experiment (RCT):

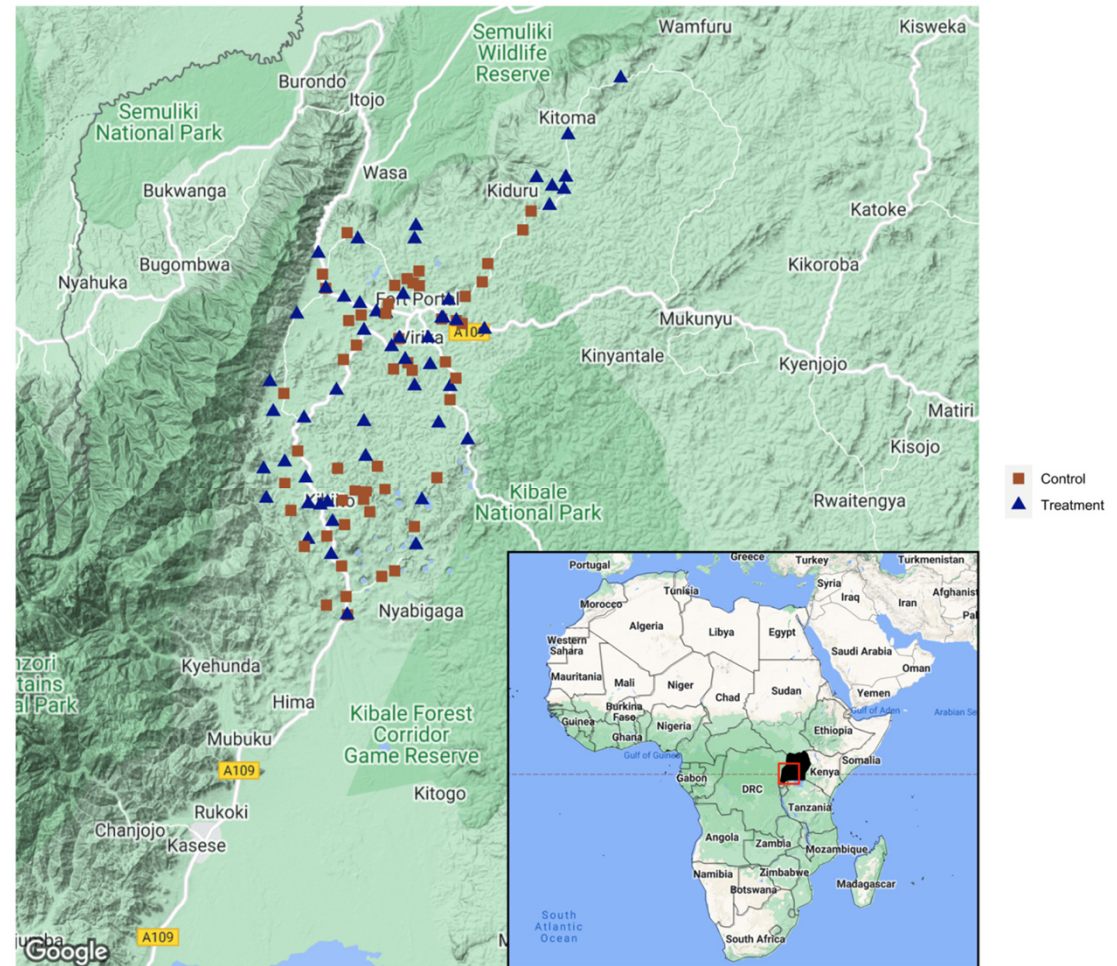
- **Heterogenous effects** by age: adults' patience measured in incentivized tasks is unaffected by the intervention after 15 months follow-up, but we observe **large effects on patience and estimated discount factors for youth** in our setting

Meta-study of other field experiments:

- **Effect of interventions on patience may be positive**, but uncertain.
- The age of students and intensity of the interventions explain a large share of between-study heterogeneity in treatment effects.

# Study #1: Field experiment on time-preferences

- RCT with 1,217 individuals in 108 villages
- Randomized half of the villages to a full-day financial education intervention with the following topics:
  - (i) personal fin. management
  - (ii) saving, consumption
  - (iii) borrowing decisions
  - (iv) business investing
  - (v) mobile payments
- Measured time-preferences of individuals after 15 months using incentivized tasks



## Baseline balance is given

Variable	Control ( <i>N</i> =629)	Treatment ( <i>N</i> =588)	Diff. (p-value)
Female	0.622	0.599	0.657
Age	33.781 (11.162)	34.766 (12.49)	0.365
Tertiary education	0.108	0.134	0.406
Household size	4.024 (2.508)	4.146 (2.643)	0.651
Monthly consumption (UGX)	493,871 (341,309)	503,600 (335,361)	0.797
Monthly savings (UGX)	701,549 (1620,014)	709,717 (1487,041)	0.756
Monthly investments (UGX)	1413,484 (2874,804)	1626,736 (3181,338)	0.585
Patience (self-reported)	5.901 (2.637)	5.997 (2.645)	0.47
Financial numeracy	0.898 (0.783)	0.92 (0.806)	0.775



# Time preference elicitation design is standard

*Panel A: Time preference elicitation design*

Budget	Sooner endowment (UGX)	Interior choice (split endowments) (UGX)	Later endowment (UGX)	$t$	$t + k$	$1 + r$
1	5,400   0	2,700   3,000	0   6,000	0	1	1.11
2	5,400   0	2,700   3,000	0   6,000	1	2	1.11
3	5,000   0	2,500   3,000	0   6,000	1	2	1.20
4	5,000   0	2,500   3,000	0   6,000	1	6	1.20

- Adapted CTB ([Carvalho et al., 2016 JDE](#)) via phone and using mobile money
- Adding “thank-you payments” in two installments (500 UGX sooner and 500 UGX later) regardless of the experimental choices to equalize transaction costs
- Outcome variables:
  - i. Share of the budget allocated to the sooner payment date
  - ii. Binary indicator of choosing the early option (at the-choice-level)
  - iii. Estimated individual discount factor  $\hat{\delta}$  (and present bias  $\hat{\beta}$ ) from a standard beta-delta utility function ([Laibson 1997, QJE](#))

# Elicited impatience measures are also externally valid

*Panel A: Impatience and field behavior*

VARIABLES	(1) ln(Savings)	(2) Tertiary education (1/0)	(3) Self-reported patience	(4) ln(Savings)	(5) Tertiary education (1/0)	(6) Self-reported patience
Allocation to sooner payment (share)	-0.784* (0.448)	-0.006 (0.031)	-0.212** (0.080)			
Impatient choice (binary)				-0.732** (0.352)	-0.005 (0.024)	-0.176*** (0.063)
Constant	10.174*** (1.043)	0.087** (0.035)	-0.339 (0.236)	10.139*** (1.041)	0.087** (0.034)	-0.363 (0.237)
R <sup>2</sup>	0.043	0.027	0.037	0.045	0.027	0.038
N (budget choices)	2,516	2,516	2,516	2,516	2,516	2,516
N (individuals)	629	629	629	629	629	629
Clusters (villages)	54	54	54	54	54	54

# Treatment impacts allocation behavior for the young

	Average treatment effects (full sample)		Heterogeneous treatment effects (≤ 24 years of age)	
<i>Panel A: Treatment effects on allocation behaviors</i>				
	(1) Allocation to sooner payment (share)	(2) Impatient Choice (binary)	(3) Allocation to sooner payment (share)	(4) Impatient Choice (binary)
Treatment	-0.016 (0.024) [0.329]	-0.023 (0.032) [0.329]	-0.146*** (0.045) [0.017]	-0.172*** (0.058) [0.017]
R <sup>2</sup>	0.042	0.039	0.102	0.104
N (budget choices)	4,868	4,868	836	836
N (individuals)	1,217	1,217	209	209
Clusters (villages)	108	108	81	81

# Treatment effects on utility parameters (Andersen 2008)

*Panel B: Treatment effects on individual utility parameters*

	Discount factor $\hat{\delta}_i$	Present bias $\hat{\beta}_i$	Discount factor $\hat{\delta}_i$	Present bias $\hat{\beta}_i$
Treatment	0.016 (0.014) [0.313]	-0.007 (0.004) [0.175]	0.077*** (0.028) [0.017]	-0.022 (0.021) [0.313]
Constant	1.090*** (0.058)	1.000*** (0.003)	0.987*** (0.060)	1.014*** (0.017)
R <sup>2</sup>	0.013	0.020	0.091	0.109
N (individuals)	1,055	1,055	186	186
Clusters (villages)	108	108	78	78

# Summary: Fin. edu. increases patience of youth

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## Results of the RCT:

- (Financial-) education intervention impacts time-preferences of youth between 16 and about 24 years.
- The change is by about 20 percent.
- There is also an effect on the estimated discount factors

## Non-results:

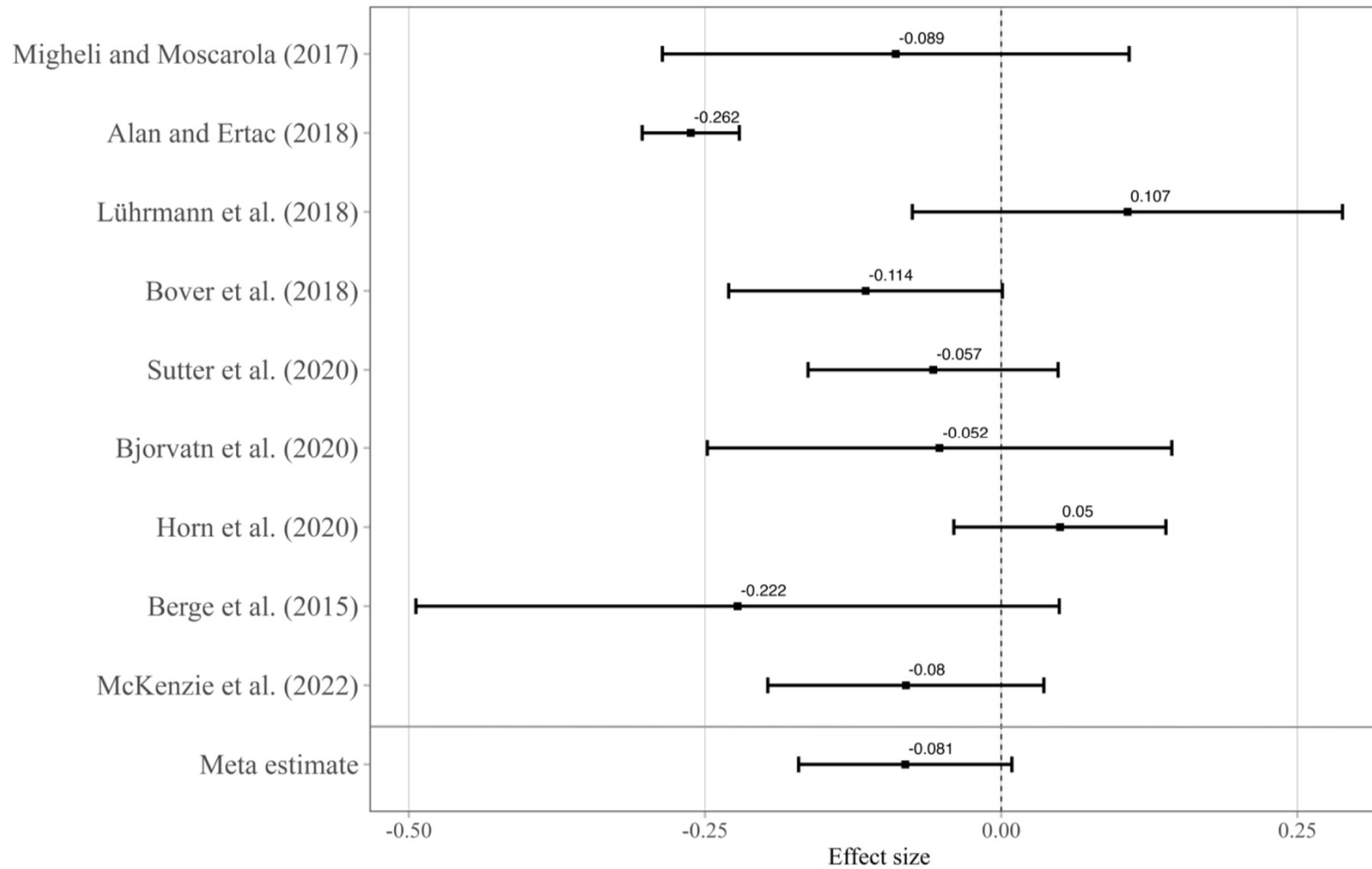
- No effect on present bias in our study (Lührmann et al., 2018, AEJ)
- No effect on choice consistency

## Study #2: Meta-analysis of earlier field experiments

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- **Inclusion:** RCTs of educational intervention on a measure of impatience elicited via incentivized decision experiments
- **Data:** 9 RCTs and 34 treatment effect estimates
- Within-study average **age ranges from 8 to 49 years**
- Intensity ranges from 1 hour to 16 hours
- Germany, Italy, Philippines, Spain, Tanzania, Turkey, Uganda
- Sample sizes from 165 to 4,100
- Delay between treatment and measurement of time preferences from immediately after to about five years after

# Treatments tend to reduce impatience (insign.)



## Age best explains study outcome heterogeneity

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- Explain heterogeneity between the 9 studies of meta-analysis.
- We consider four variables as potential determinants, i.e.: age of participants (-), intensity of trainings (+), delay of impact measurement (-), target group from developing country (?)
- **Age has a strong effect in explaining heterogeneity.** Age-squared indicates a declining marginal effect of age: together they explain 75% of heterogeneity.
- The other variables do not sign. explain heterogeneity on their own.
- However, **age plus intensity explain close to 100%**



## Result: (Fin.) Edu. increases patience of the young

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- (Financial-) education interventions tend to **impact time-preferences of children, youth and young adults.**
- This could be an important **mechanism** explaining part of the treatment effects of financial education on outcomes, such as saving (and investment) behavior [\(Lusardi and Mitchell 2014, JEL; Kaiser et al. 2022, JFE\)](#)

## Outlook on future research

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1. 9 heterogeneous studies → **more** evidence in general
2. Ideally covering the „**critical age**“ between 10 and 30 years
3. More often **long-term** treatment effects
4. Analyses of **other preferences** (i.e., risk preferences)