# Self-Confidence and Motivated Memory Loss: Evidence From Schools

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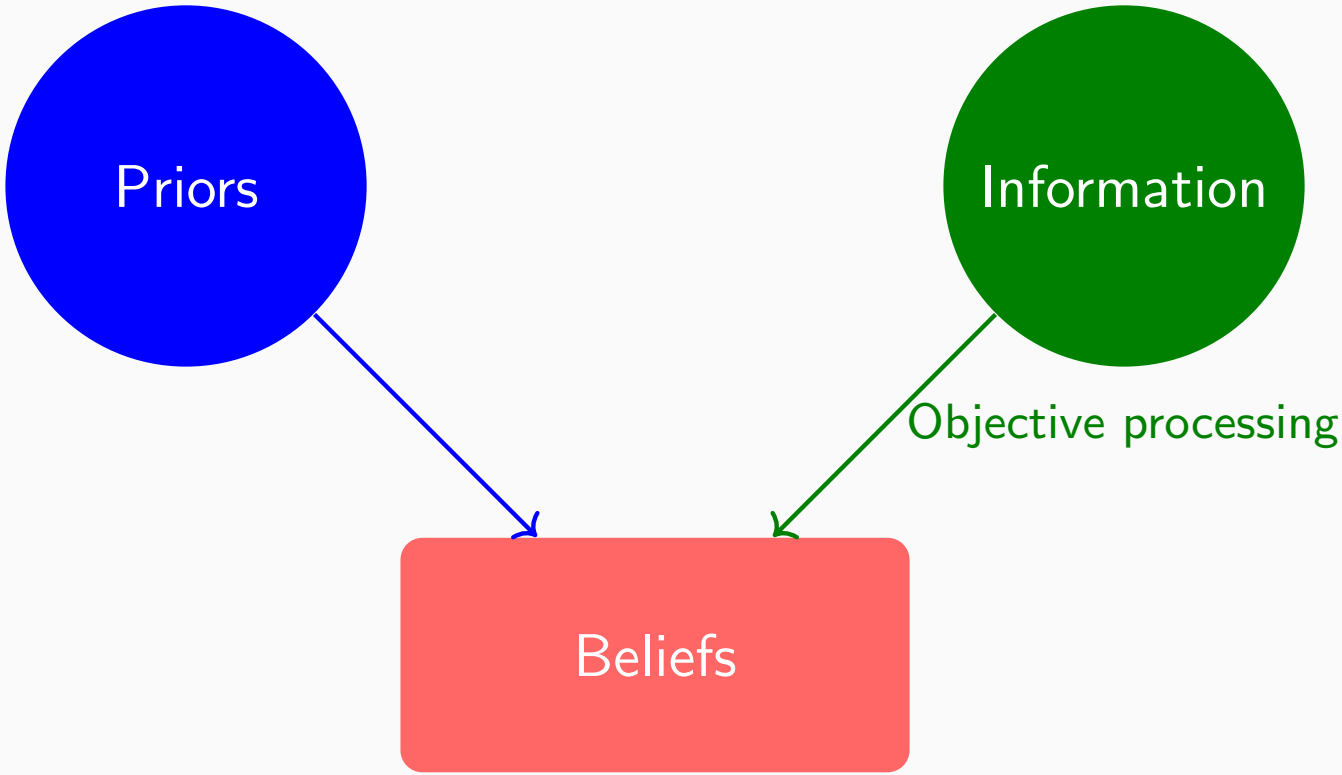
# Motivation

- 'Self-confidence' = beliefs about ability
- Important for schooling choices
  - How much do I invest in human capital during school?
  - What do I choose to do after school?
- Also potentially important for attainment
- How do we form these beliefs?

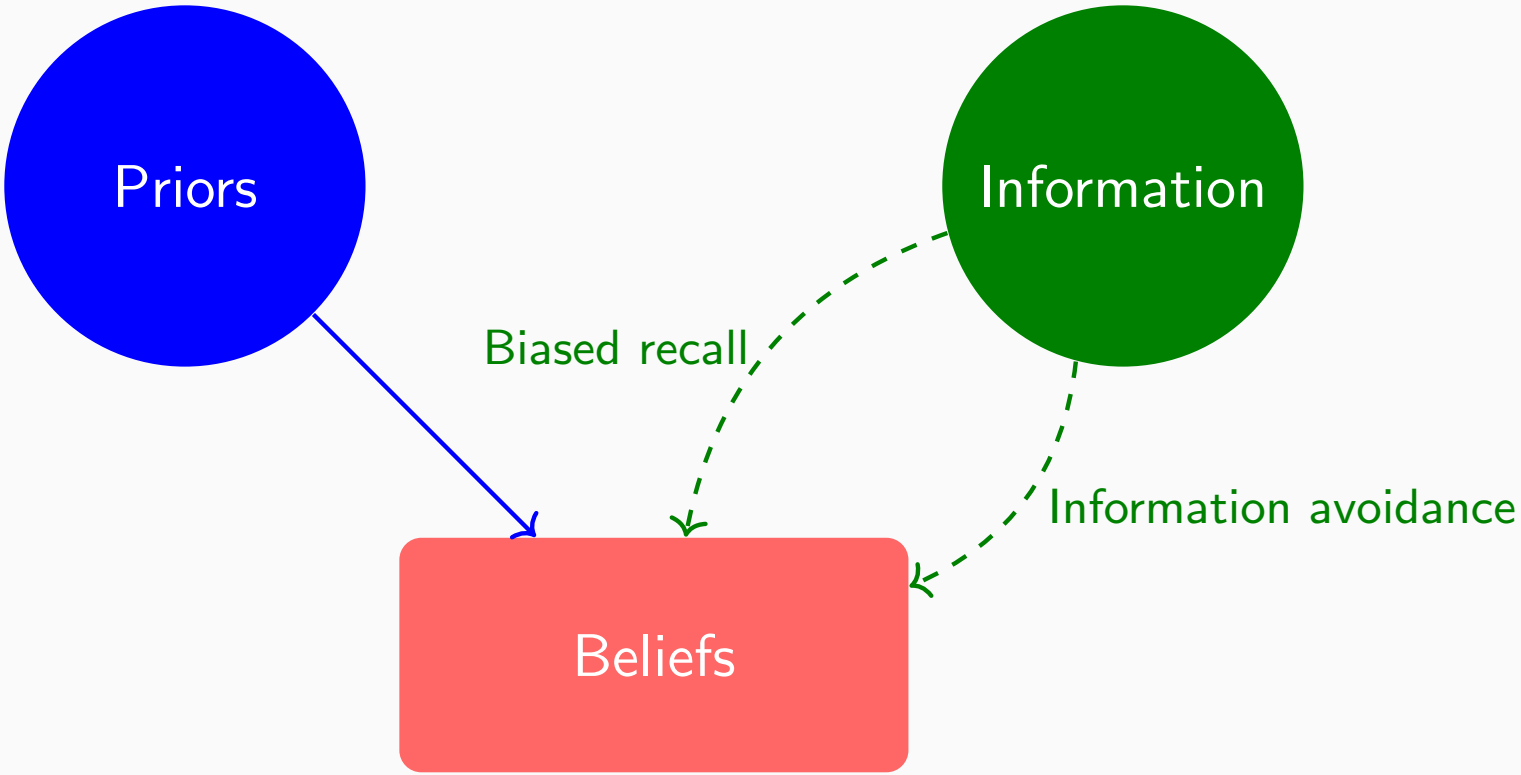
# Classical model



# Challenges

- Why are individuals persistently overconfident in ego-relevant domains (intelligence, ability)?
- What if we prefer to hold certain beliefs, e.g. we are smart?

# Motivated beliefs



# Research question

Are **motivated beliefs** an important part of the link between grades and children's self-confidence at school?

1. Biased recall, memory, and overconfidence
2. Heterogeneity in use of biased recall
3. Feedback interventions

# Outline

# Data: Beginning School Study

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- Panel data; representative sample of ∼800 children at Baltimore City public schools initially in first grade in 1982
- Typically surveyed children twice per year of school until leaving, in Fall and Spring
- Study run by sociologists, interested in causes of racial and socioeconomic inequality in educational outcomes

# Variables and sample

- Actual grades
- Students' recall of most recent grade:
  - *Remember the last report card you got when school ended for the summer? You could have gotten marks like E (Excellent), G (Good), S (Satisfactory), or U (Unsatisfactory).*
    *What mark did you get in [mathematics]?*
- Students' predictions of next grade
- Students' beliefs about ability
  - *How smart do you think you are compared to other kids in your school this year?*

# Definition of grades

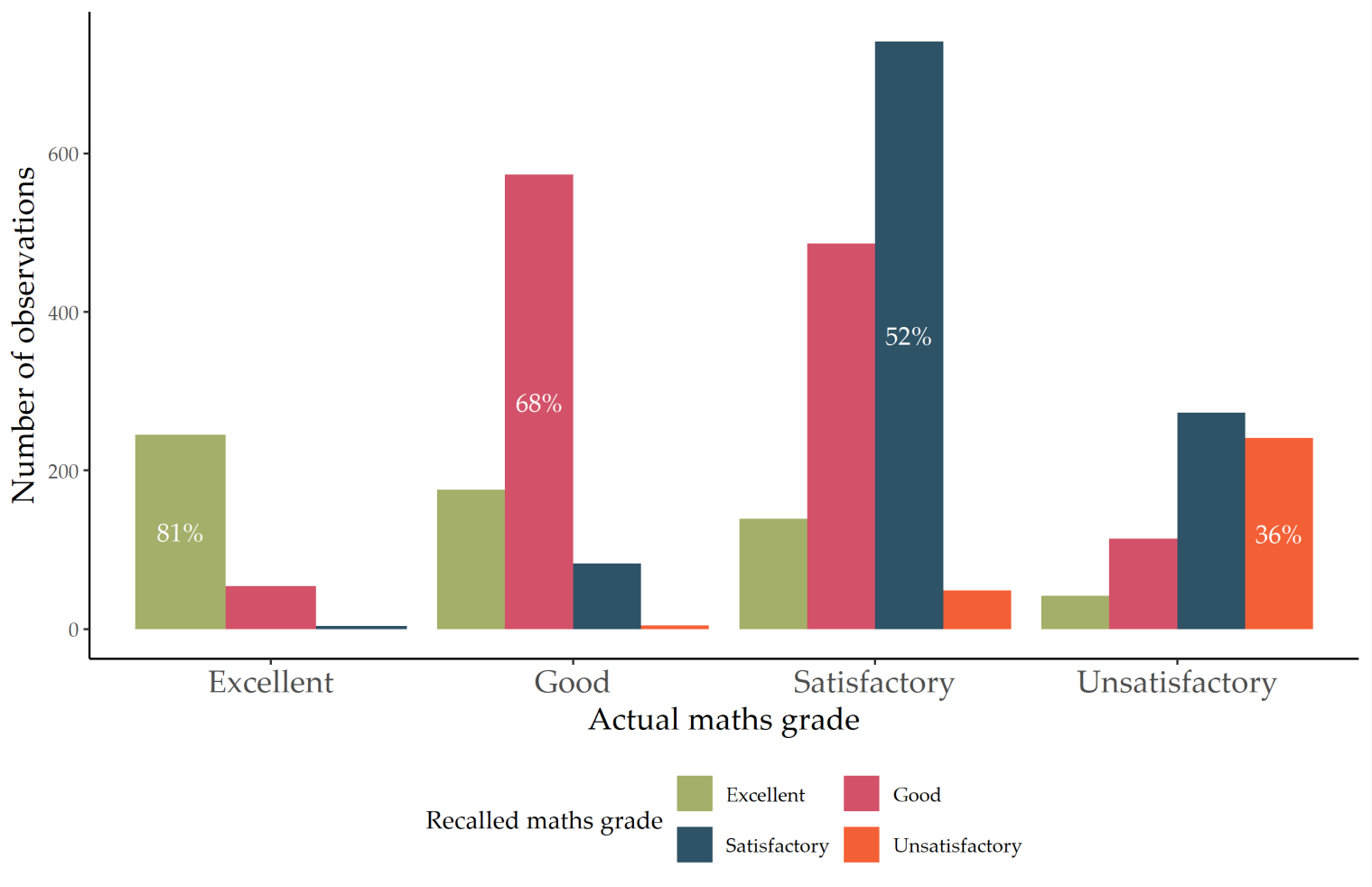
| Grade | Score |
|---|---|
| *Excellent* | 90–100% |
| *Good* | 80–89% |
| *Satisfactory* | 70–79% |
| *Unsatisfactory* | $<$70% |

# Reduced form analysis

# Recall by grade

1. Is a recall error more likely when a lower grade is received?
   - Good news-bad news effect

# Asymmetric information processing




- Recall errors more prevalent for lower grades; positively biased

# Memory loss

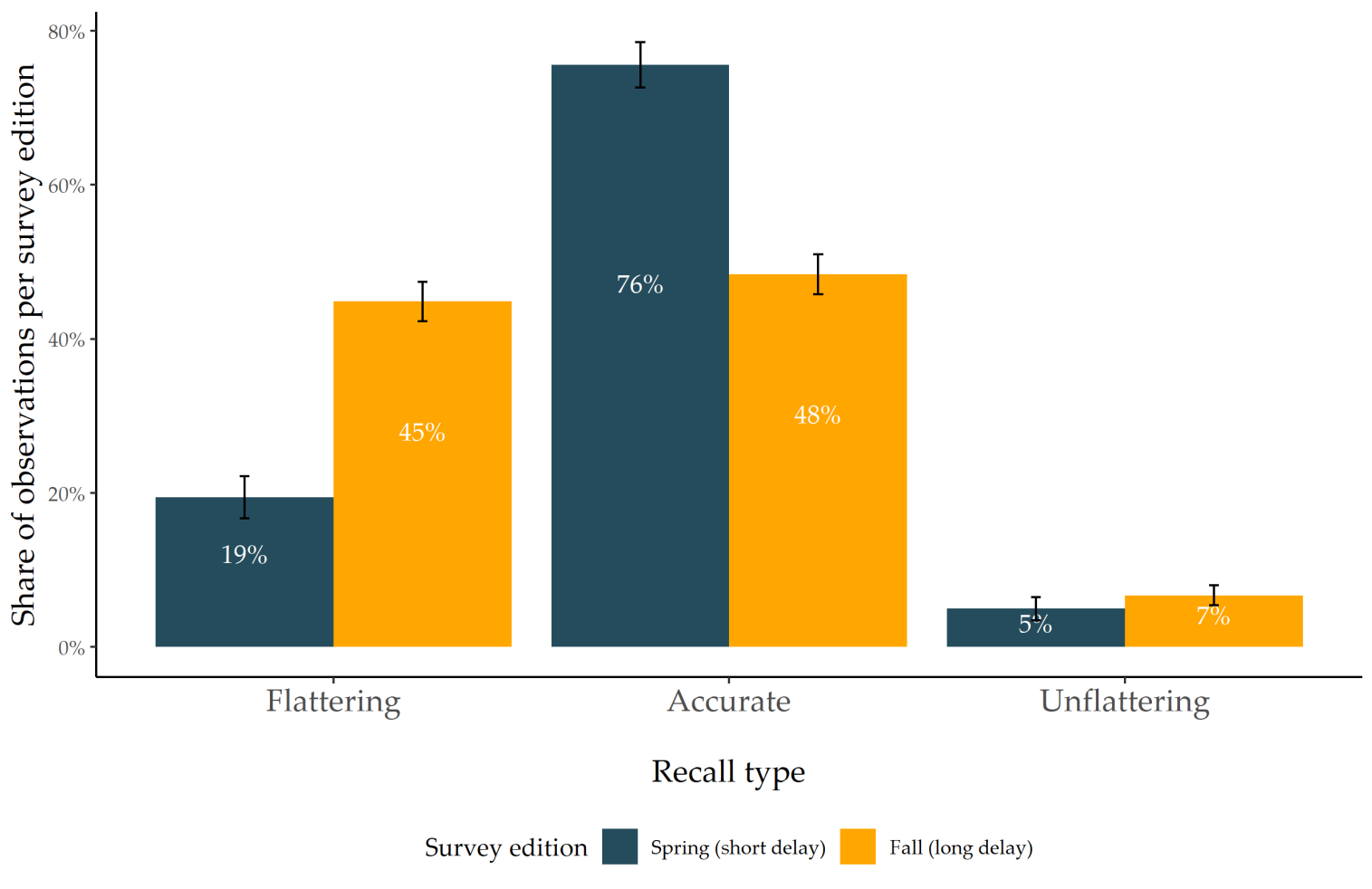
❷ Does recall become more positive as time passes?

- Role of motivated (biased) memory loss

# Memory loss

- Little evidence on memory loss and motivated beliefs other than Zimmermann (2020) in the lab
- Spring survey collected $\sim 1$ month after relevant grades; Fall survey collected 3-5 months after relevant grades
  - Recall of grades is substantially less accurate in Fall
  - Memory loss should account for differences in recall between Spring and Fall

# Memory loss




- Substantially increased positive recall bias in Fall periods

# Overconfidence

3. Is a given student more likely to overconfidently predict their next grade when they recall an incorrectly high grade?
    - Biased recall linked to beliefs

# Overconfidence

| | *Dependent variable:* | | |
|---|---|---|---|
| | Overconfident prediction | | |
| | (1) | (2) | (3) |
| Positively biased recall | 0.082*** (0.023) | 0.069*** (0.024) | 0.129*** (0.020) |
| Actual grade: *Satisfactory* | −0.022 (0.029) | −0.018 (0.029) | 0.040* (0.023) |
| Actual grade: *Unsatisfactory* | −0.039 (0.037) | −0.030 (0.037) | 0.076*** (0.028) |
| Fall | | 0.051** (0.024) | 0.036 (0.024) |
| Individual FE | Yes | Yes | No |
| Academic year FE | Yes | Yes | Yes |
| Observations | 2,473 | 2,473 | 2,473 |
| $R^2$ | 0.341 | 0.342 | 0.041 |
| Adjusted $R^2$ | 0.130 | 0.131 | 0.038 |

$^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$. Linear probability model, robust standard errors in parentheses. All grades are from quarterly report cards for mathematics, and recalled and expected quarterly grades are elicited in a biannual survey. The sample excludes all observations where the previous or next grade is *Excellent*. The omitted actual grade category is *Good*.

# Structural model

# Outline

- Subconscious discrete choice problem
- Choice variable is recalled grade $r_t \in \{0, 1\}$. $1 \implies$ the student recalls *Good* or *Excellent*
- Infinite horizon; forward-looking optimisation
- Estimate by FIML after making standard assumptions on state variables and error terms (first-order Markov, exogeneity, iid errors, Gumbel)

# Outline

Essence of model:

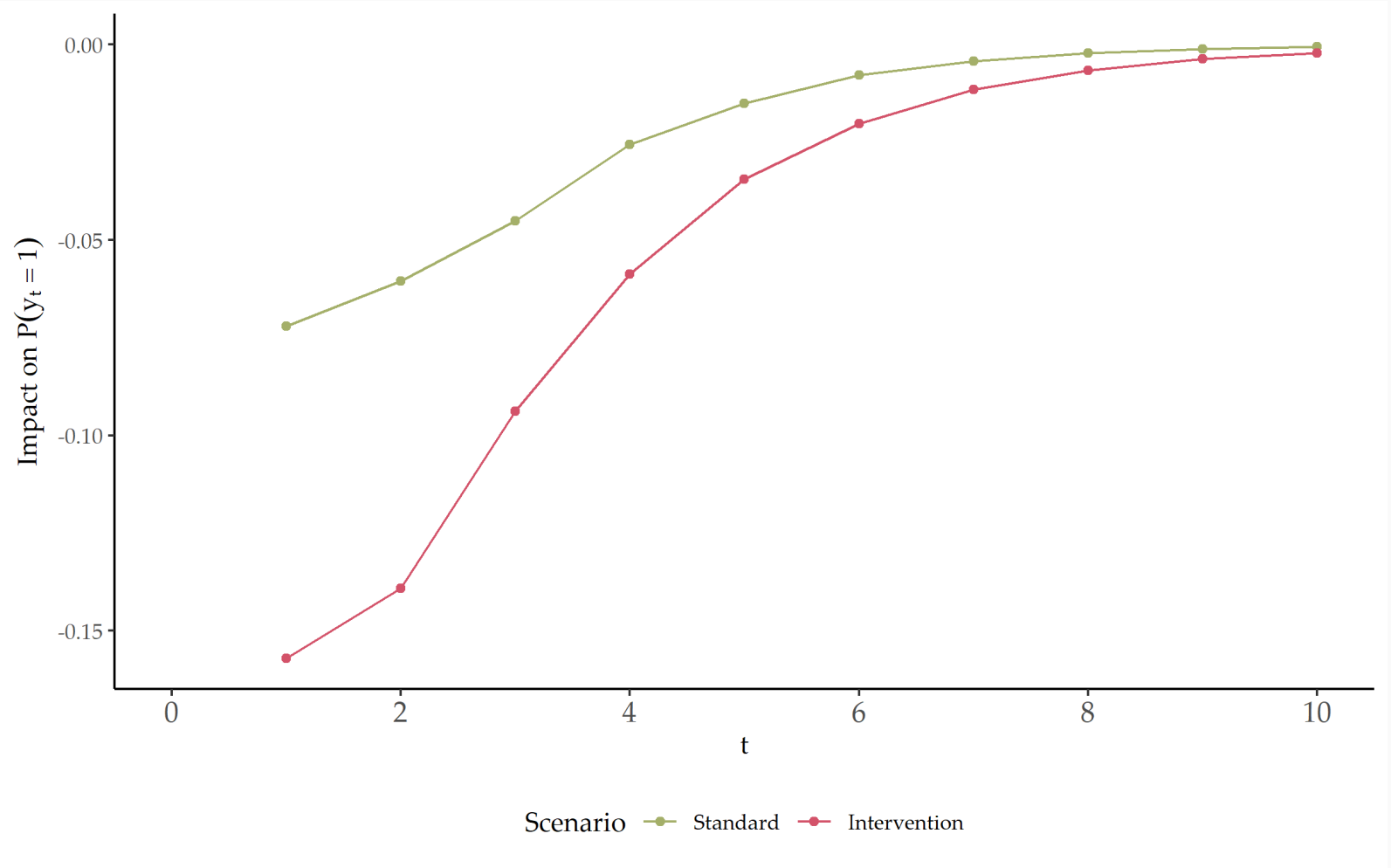
- Can estimate strength of preferences to recall high grades and the costs of distorting recall.
- Recalled grades, actual grades, and self-confidence end up following a first-order Markov system.
- Also estimate a version of the model with unobserved heterogeneity: two types of student with different preference and state variable parameters.

# Parameter estimates

- All students have preferences to recall high grades but are strongly constrained by reality
- In the two-type model, high achievers have much stronger preferences to recall high grades
- Inflated self-confidence is more stable for high achievers
- Evidence of fragile self-esteem (Kőszegi et al., 2022): recalling high grades is more likely if self-esteem is already high

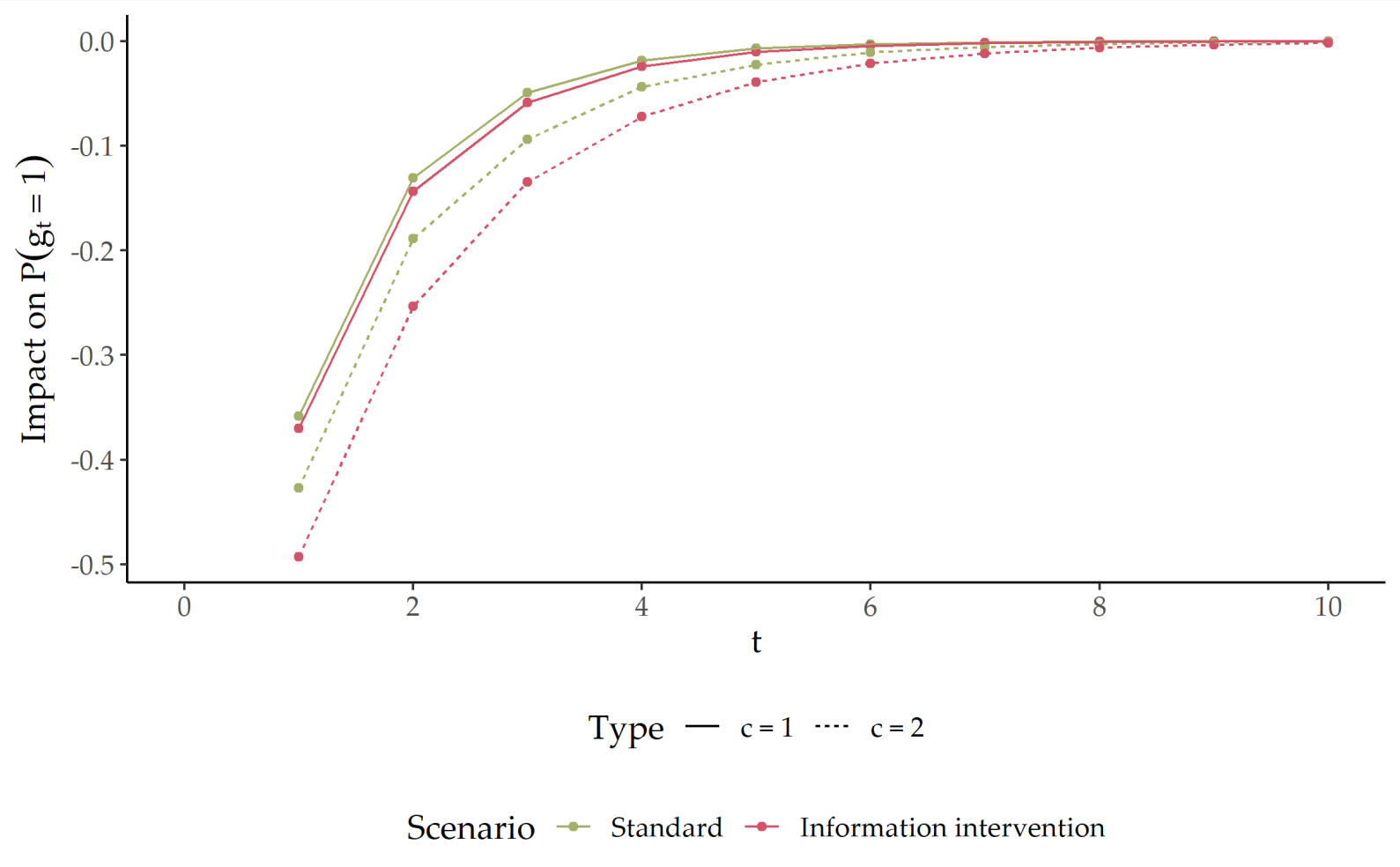
# Information intervention negatively impacts self-confidence

**Figure 1:** Impact of poor grade on self-confidence



# Information intervention widens attainment gaps

**Figure 2:** Impact of poor grade on future grades for $c = 1$ (high achievers) and $c = 2$ (low achievers)



# Conclusion

- Motivated beliefs and biased memory are important during childhood
- Biased recall associated with overconfident beliefs
- Self-confidence may be self-sustaining
- High achievers use biased recall more intensively
- Possible unintended consequences of information interventions