ESRI ECONOMIC & SOCIAL RESEARCH INSTITUTE

Experimental tests of comprehension and perception of pensions

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VENUE
Pensions and retirement Conference, ESRI

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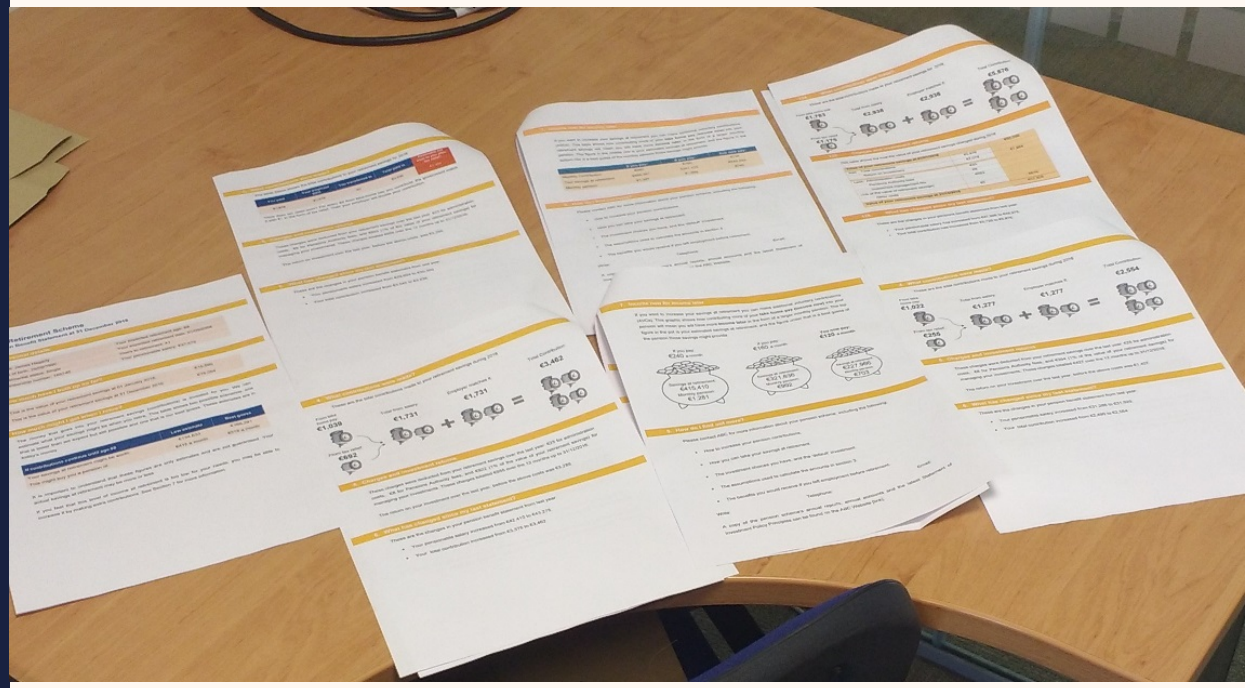

An tÚdarás Pinsean
The Pensions Authority

Two studies

1) Pensions Benefit Statement (PBS) design
2) Understanding money growth

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ARTICLE

Supporting decision-making in retirement planning: Do diagrams on Pension Benefit Statements help?

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(Received 13 February 2018; revised 3 January 2019; accepted 6 January 2019)

Abstract
This paper investigates whether exposure to explanatory diagrams can affect a major financial decision. In a controlled experiment, participants were given Pension Benefit Statements with or without one or two diagrams, before answering incentivised questions that measured recall, comprehension and choice of

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Working Paper No. 611

February 2019

Underestimation of money growth and pensions: Experimental investigations

Féidhlim P. McGowan[a], Pete Lunn[ab], Deirdre A. Robertson[ac]

Abstract: People underestimate long-term growth in savings because they linearise exponential growth – a phenomenon known as exponential growth bias (EGB). This bias has implications for multiple financial decisions, particularly those relating to lump sums, because savers need also to estimate accumulation. The additional cognitive load could strengthen EGB, or individuals might underestimate accumulation in addition to EGB. Four experiments investigated: (1) whether underestimation occurs when questions are framed intuitively as the cost of delaying regular savings relative to lump sums; (2) whether underestimation of money growth is greater for long streams of regular savings than for lump sums; and (3) whether practice with a calculator designed to illustrate the cost of delay attenuates starting a pension; and (4) whether practice with a calculator designed to illustrate the cost of delay attenuates underestimation. Individuals were more likely to underestimate contributions in addition to displaying EGB. Underestimation was substantial and persistent. Practice with a calculator partially attenuated underestimation, primarily among individuals with higher educational attainment and without a pension. Overall, these findings imply that across multiple judgements, decisions and frames, individuals substantially underestimate money growth, reducing the attractiveness of saving.

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1) PBS Study: Context

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Key words: Decision-making; experiment; information disclosure; retirement planning

JEL Codes: C91; D14; D91

1. Introduction

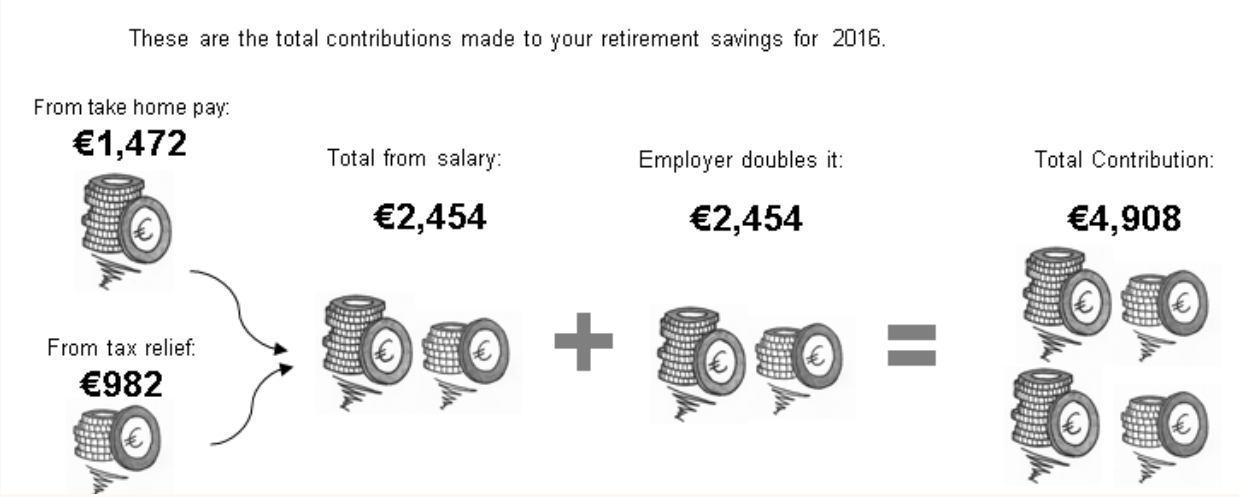
There is a growing concern among economists and policymakers that many individuals have insufficient savings for retirement (Crawford and O'Dea, 2012; Munnell *et al.*, 2012; Benartzi and Thaler,

- New EU Directive on Pension Benefit Statement (PBS)
- Key provision: "Institutions should provide clear and adequate information to members… to *support their decision-making* about their retirement" [emphasis added]

Experiment

- Evidence from educational psychology suggests graphics can aid comprehension and decision making
- Representative sample of 176 consumers
- 2 x 2 x 2 orthogonal design
  - Graphical v tabular display of contributions
  - Graphical v tabular income projections
  - Written v tabular information on costs
- Range of salaries, standard and higher tax rate
- Scenario: “Imagine you are at a friend’s house, and your friend asks you to look at a letter they received…”

Contributions Manipulation



v

The table below shows the contributions to your retirement savings during 2016

You paid	Your employer paid	You transferred in	Total paid in	*Estimated net cost to you after tax relief**
€2,454	€2,454	€0	€4,908	€1,472

*How does tax relief work? For every €3 from take-home pay you contribute, the government match it with €2 in the form of tax relief. Then your employer will double your contribution.

Money Growth Manipulation

v

	If You Pay:	If You Pay:	You Now Pay:
Monthly Contribution	€246	€184	€123
Your savings at retirement	€386,027	€318,787	€251,546
Monthly pension	€1,239	€1,023	€807

Costs Manipulation

These charges were deducted from your retirement savings over the last year: €25 for administration costs, €8 for Pensions Authority fees, and €396 (1% of the value of your retirement savings) for managing your investments. These charges totalled €429 over the 12 months up to 31/12/2016.

The return on your investment over the last year, before the above costs was €1,414.

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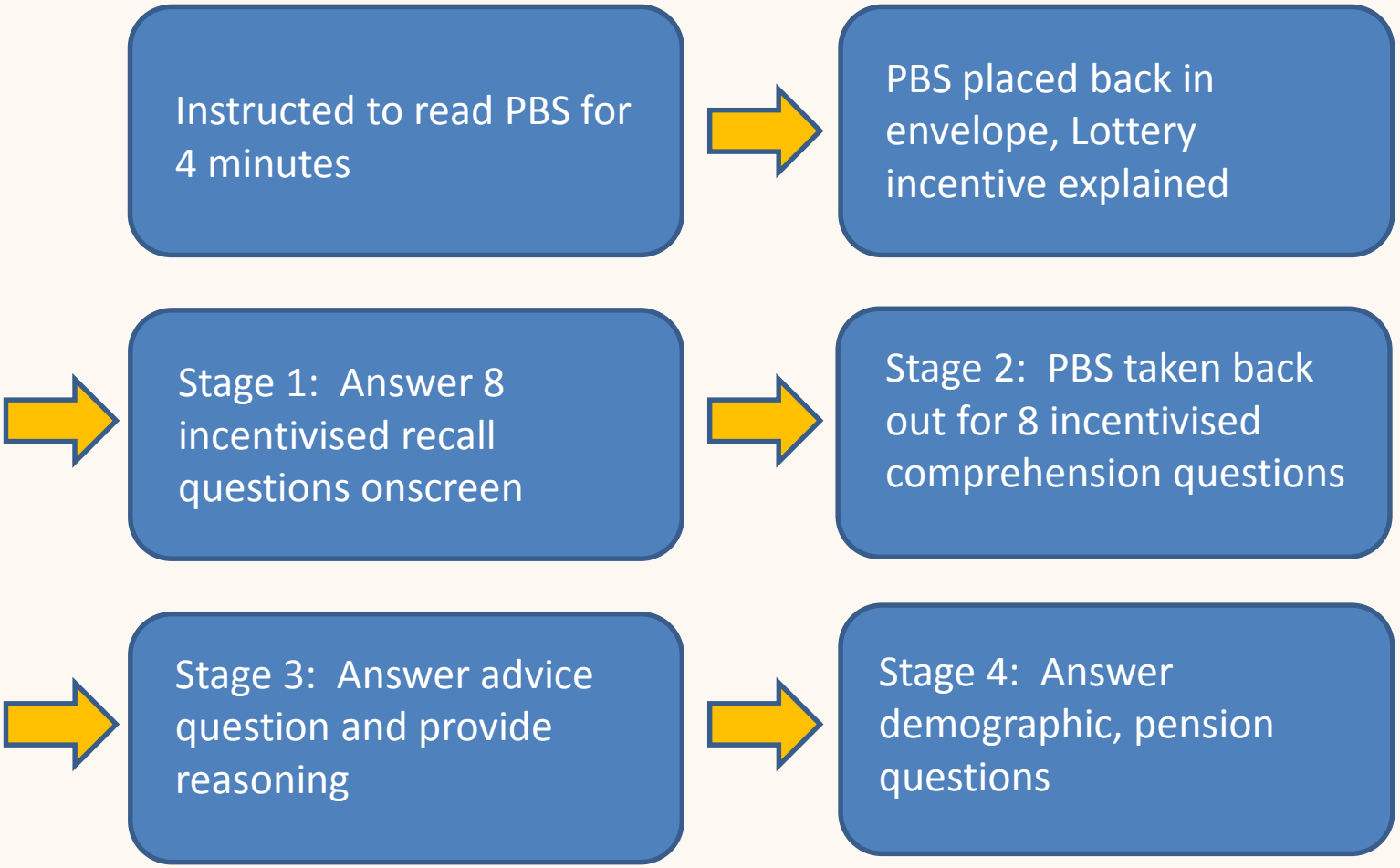
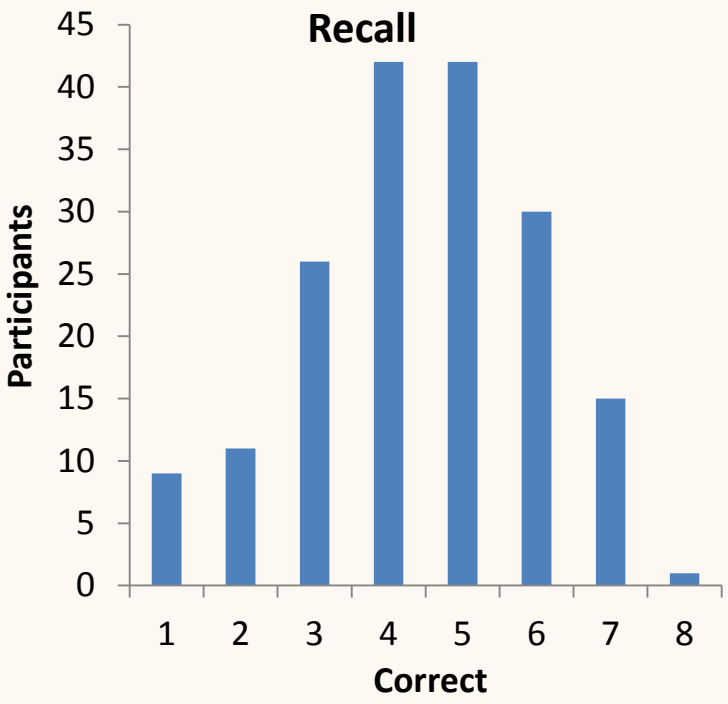
This table shows how the value of your retirement savings changed during 2016.

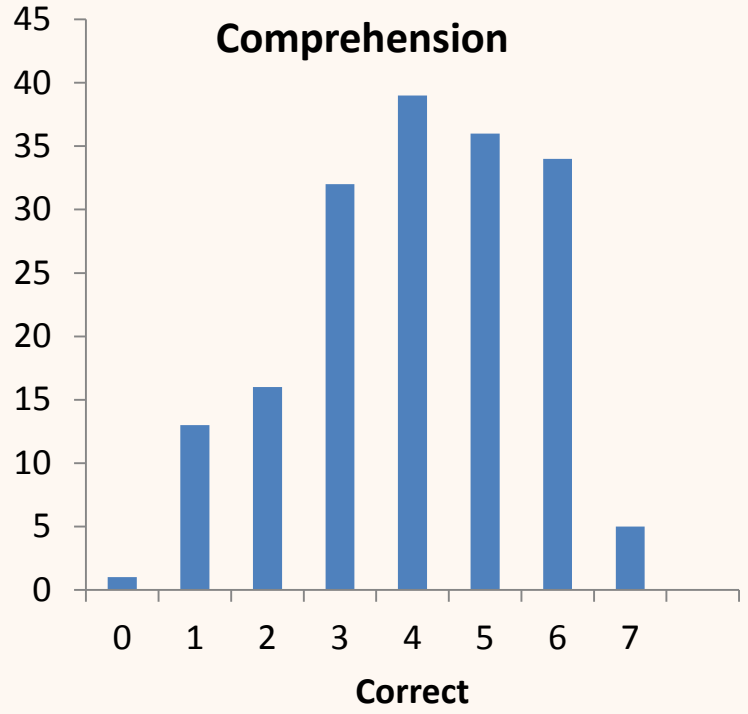
Value of your retirement savings at 31/12/2015		€35,590
Add: Total Contributions	€2,752	
Return on Investment	€1,414	€39,755
Less: Administration costs	€25	
Pensions Authority fees	€8	
Investment management fee (1% of value of your retirement savings)	€396	
Other costs	€0	- €429
Value of your retirement savings at 31/12/2016		€39,326

Experimental Procedure



Correct Responses





NB. Answers to contributions questions essentially at chance levels

TAX RELIEF IS INCOMPREHENSIBLE !

Performance by PBS Format

RECALL	Reject Null?	P Value if Reject
Contributions – largest?	No	N/A
Contributions – total?	Yes	0.025
Savings – THP now?	No	N/A
Savings – increase?	No	N/A
Costs – total?	No	N/A
Costs – return?	No	N/A

COMPREHENSION	Reject Null?	P Value if Reject Null
Contributions – THP > total increase?	No	N/A
Contributions – Salary > total decrease?	No	N/A
Savings – Pension if double contribution?	Marginal	0.095
Savings – If interpolated contribution?	No	N/A
Costs – Charge if same growth?	No	N/A
Costs – Fund growth?	No	N/A

Advice: models of p("increase") – odds ratios

	(1)	(2)	(3)	(4)
Contributions diagram	.945 (.319)	1.04 (.373)	.841 (.293)	.945 (.348)
Growth diagram	1.86** (.635)	2.62*** (.986)	1.87** (.653)	2.54*** (.962)
Tabular costs	1.67 (.566)	1.39 (.508)	1.56 (.541)	1.39 (.515)
Male		1.20 (.433)		1.16 (.420)
Over 35		.671 (.254)		.771 (.304)
Degree		3.29*** (1.24)		3.10*** (1.18)
Pension holder		1.94* (.737)		1.61 (.651)
Comprehension score (Stage 2)			1.35*** (.149)	1.18 (.147)
Constant	1.48 (.477)	.578 (.293)	.578 (.293)	.578 (.293)
Obs.	176	176	176	176

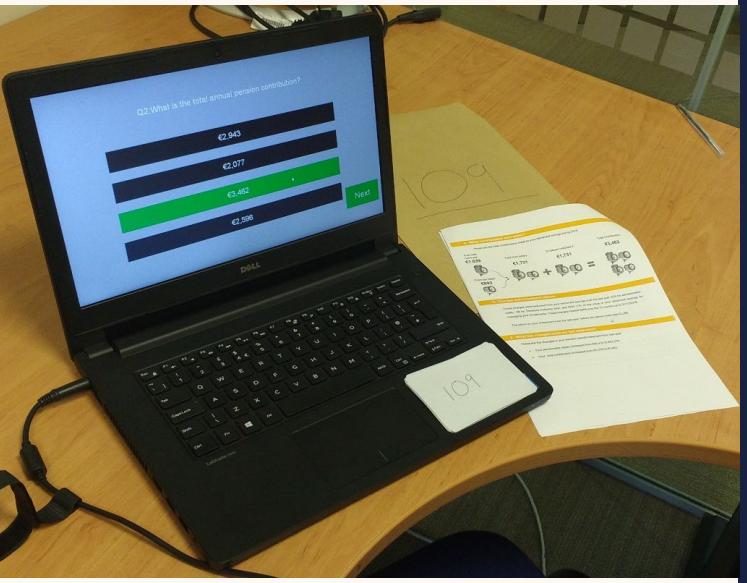
* p<0.1
** p<0.05
*** p<0.01

Models of decision rationale

	Contributions rationale		Projections rationale	
	(1)	(2)	(3)	(4)
Contributions diagram	2.40** (1.10)	2.84** (1.38)	1.21 (.431)	1.24 (.457)
Growth diagram	.750 (.330)	.929 (.426)	1.77* (.636)	2.01** (.747)
Tabular costs	.909 (.398)	.791 (.368)	1.77 (.636)	1.61 (.602)
Male		.945 (.432)		1.12 (.409)
Over 35		1.07 (.514)		.696 (.263)
Degree		3.05** (1.68)		1.93* (.766)
Pension holder		2.34* (.1.16)		.937 (.356)
Constant	.120*** (.056)	.029*** (.023)	.159*** (.063)	.120*** (.067)
Obs.	176	176	176	176

* p<0.1
** p<0.05
*** p<0.01

PBS Conclusions



- Diagrams on PBSs **DO** make a difference:
  - Growth graphic increased inclination to raise contributions
  - Increased likelihood of providing relevant rationale for advice
- **BUT**
  - Tax relief impenetrable
  - Only marginally improved recall/comprehension
  - So do graphics improve decisions?
    - Maybe… they move people towards those with more education and higher comprehension

2) Money growth study

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Abstract: People underestimate long-term growth in savings because they linearise exponential growth – a phenomenon known as exponential growth bias (EGB). This bias has implications for multiple financial decisions, particularly those relating to pensions. We hypothesised that underestimation might be even more severe for regular savings relative to lump sums, because savers need also to estimate accumulation. The additional cognitive load could strengthen EGB, or individuals might underestimate accumulation in addition to EGB. Four experiments investigated: (1) whether underestimation occurs when questions are framed intuitively as the cost of delaying lump sums; (2) whether practice with a calculator designed to illustrate the cost of delay attenuates underestimation. Individuals were more likely to underestimate money growth from regular savings than from starting a pension; and (3) whether practice with a calculator designed to illustrate the cost of delay attenuates lump sums, because they failed to accumulate contributions in addition to displaying EGB. Underestimation was substantial and persistent. Practice with a calculator partially attenuated underestimation, primarily among individuals with higher educational attainment and without a pension. Overall, these findings imply that across multiple judgements, decisions and frames, individuals substantially underestimate money growth, reducing the attractiveness of saving.

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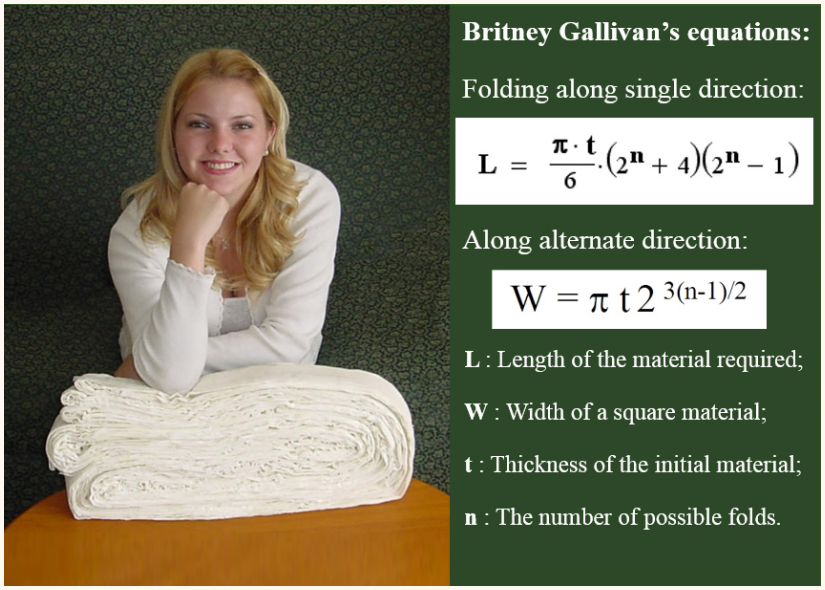
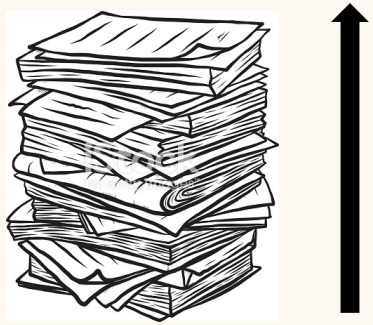
- Do people understand money growth?
- Is it subject to systematic bias, e.g. exponential growth bias?
- Does regular saving make a difference?
- Does framing more psychologically realistic framing alter judgement?
- Can we improve judgement?
- Three experiments…

Exponential Growth Bias





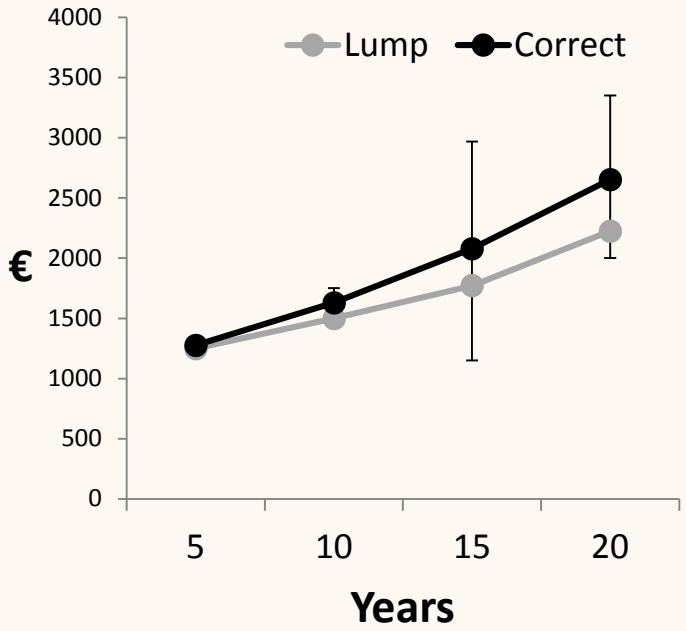
So the record is 12, but suppose you could fold it 42 times – how high?

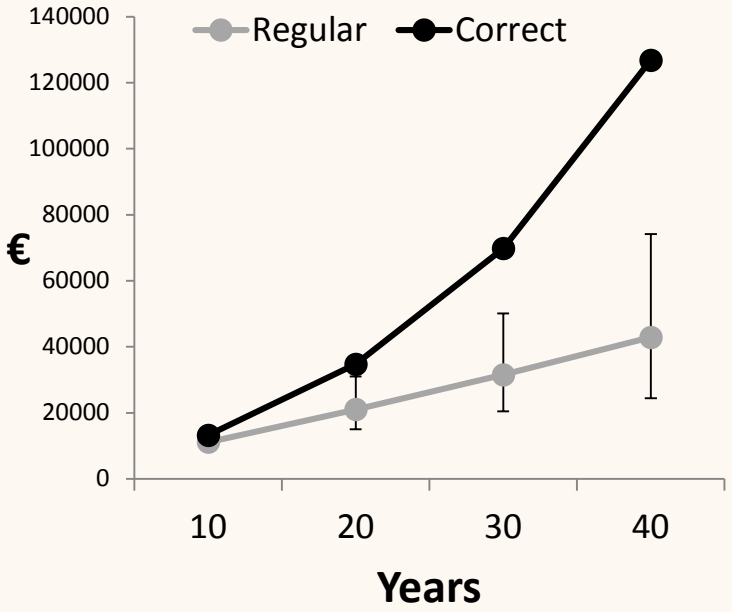
0.0000001×2^{42}
$= 439{,}805$ km

…that's further than the moon!

Experiment 1a

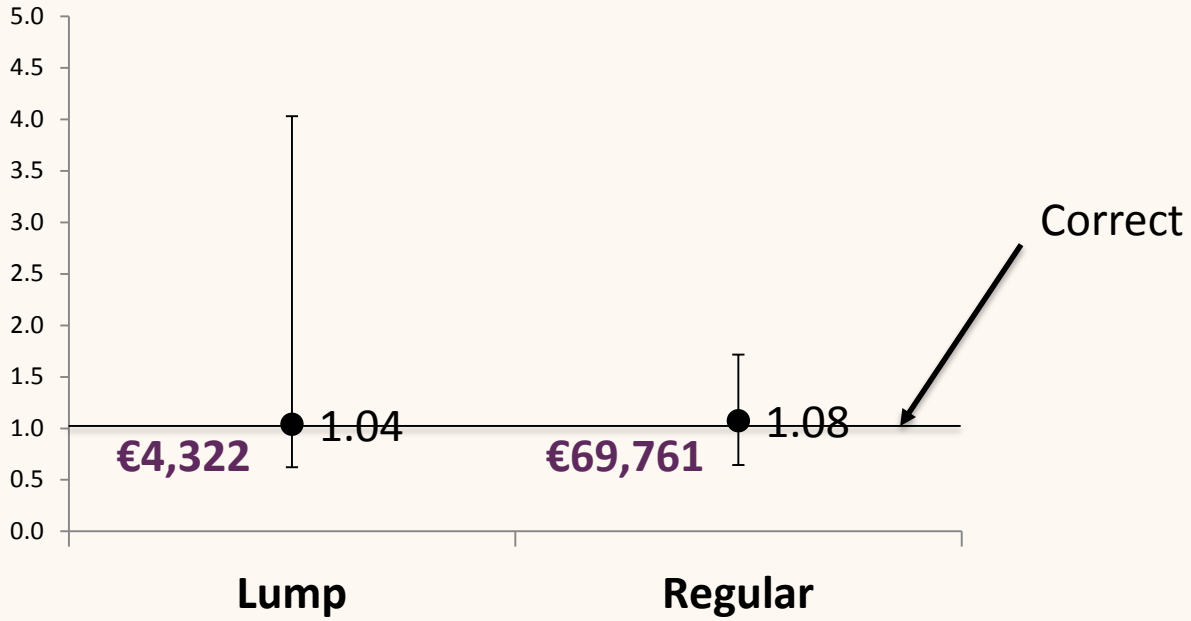
77 members of the public asked to guess amounts if they had €1,000 earning 5% per year, and regular saving of €1,000 per year at 5% per year



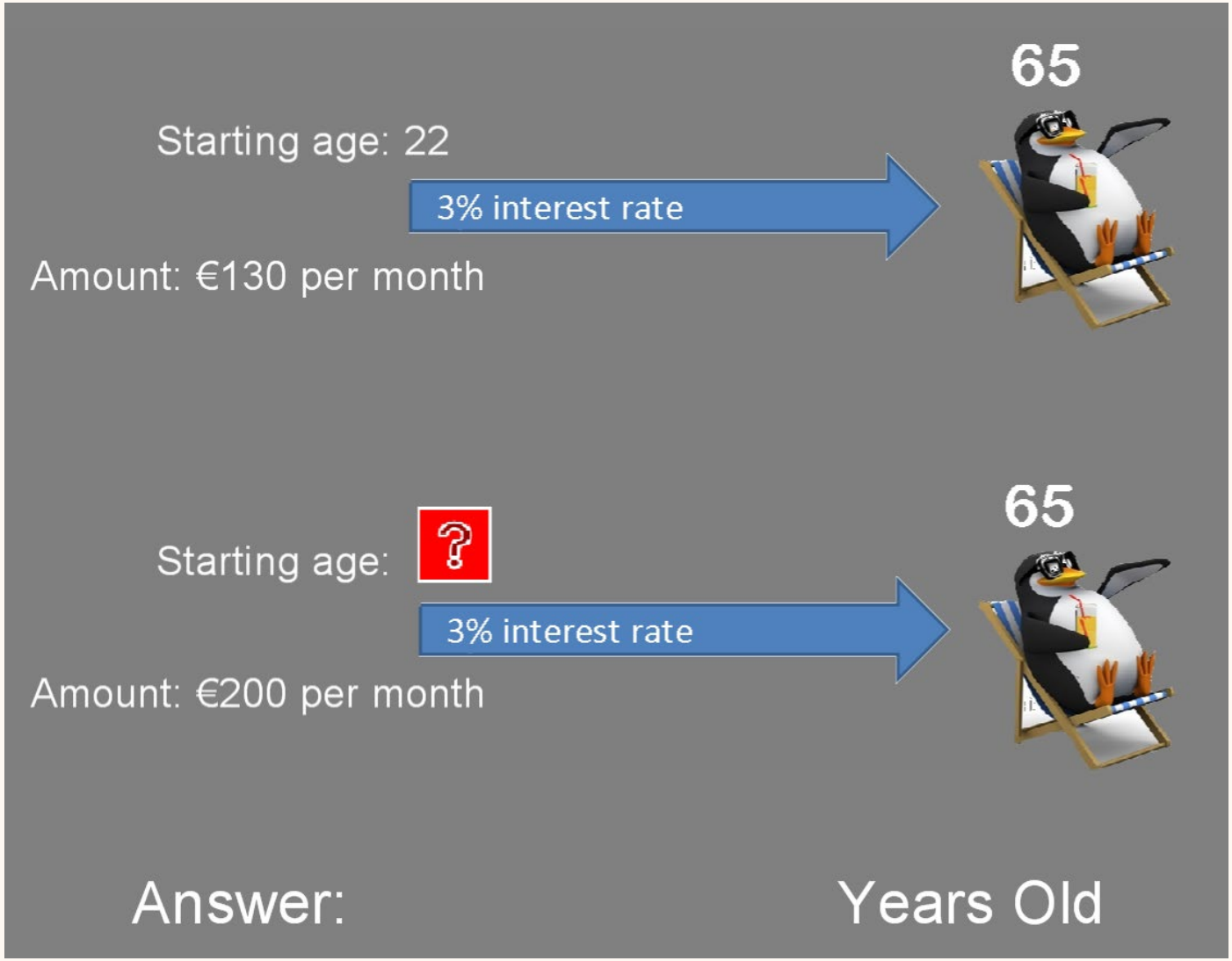


Experiment 1b: Expert sample

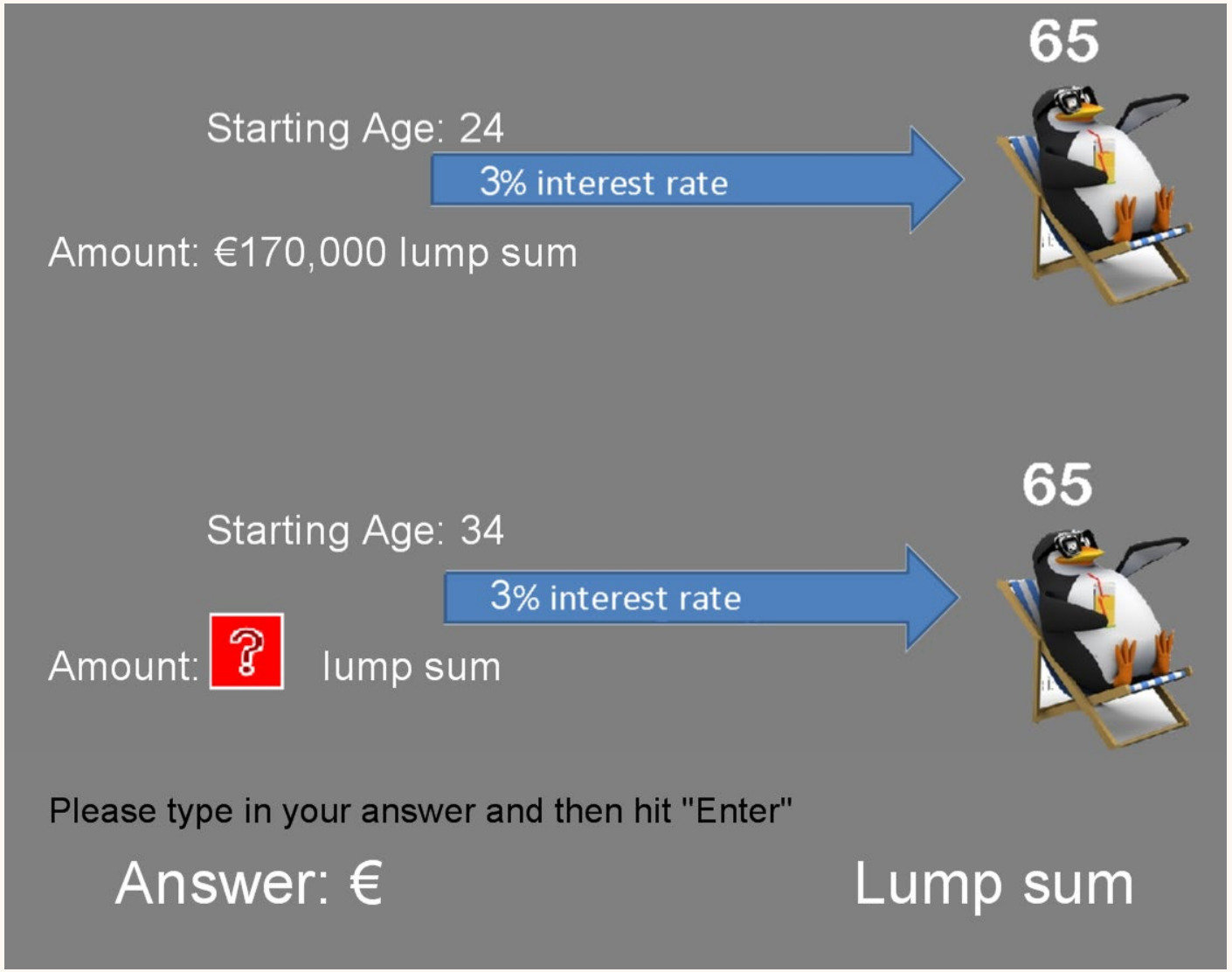
38 attendees at Irish Economics and Psychology Conference asked to guess amounts if they had €1,000 earning 5% for 30 years, and regular saving of €1,000 per year at 5% for 30 years



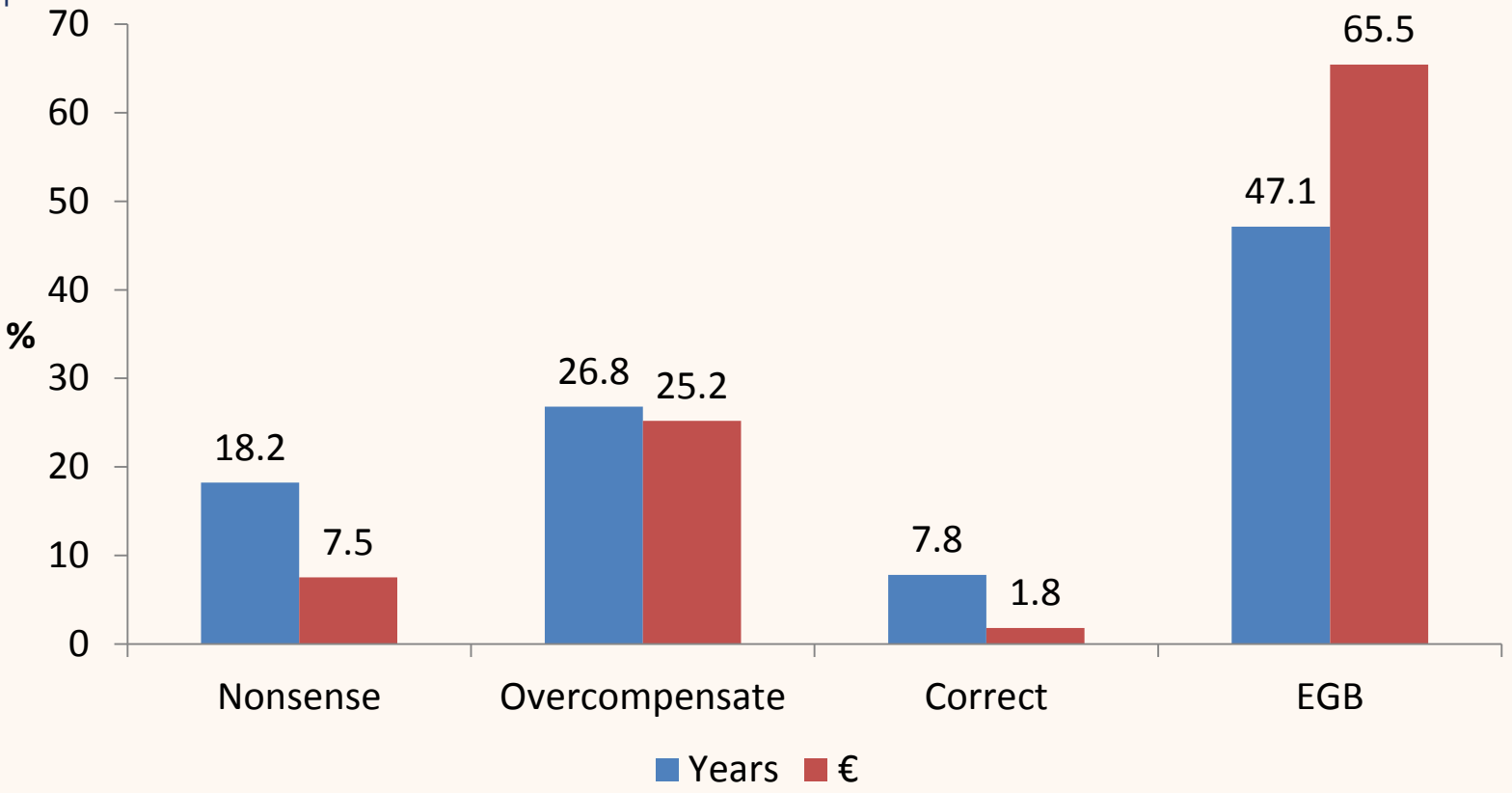
Experiment 2 – "Years" condition



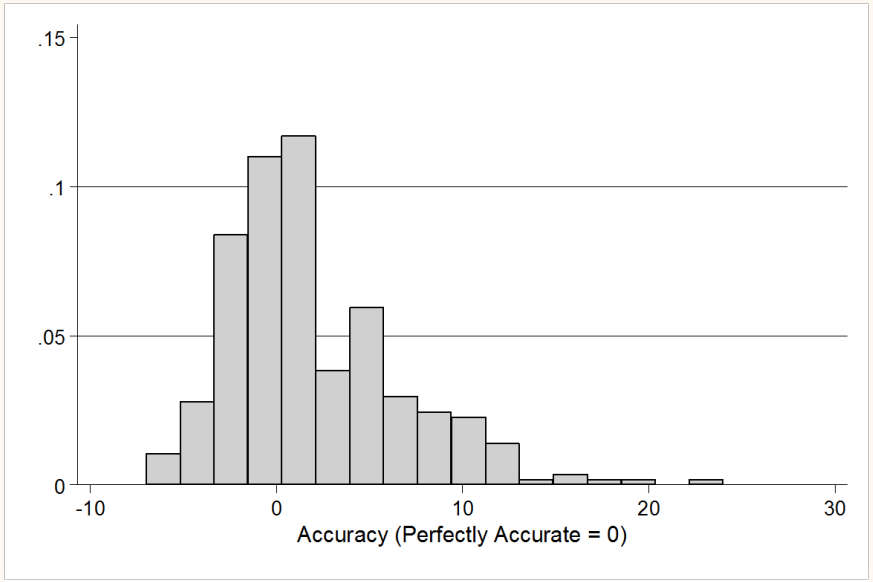
Experiment 2 – "Euro" condition



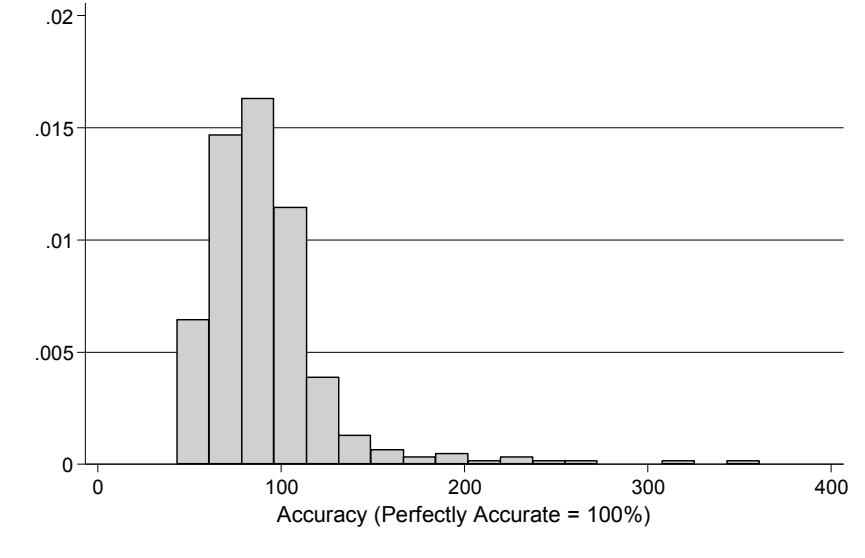
Exponential growth bias?



Very large variability



Years



Euro

Experiment 3: Years Calculator

Start saving sooner

If every month I save: €200

And I start saving at: 30

18 65

If I save more later, what age could I start saving?

But if every month I save: €300

I can start saving at age: **36**

By age 65, I will save a total of: **€227,607**

Calculate

If you save €200 per month from age 30, you will have the same amount saved by age 65 as if you save €300 per month from age 36.

Next

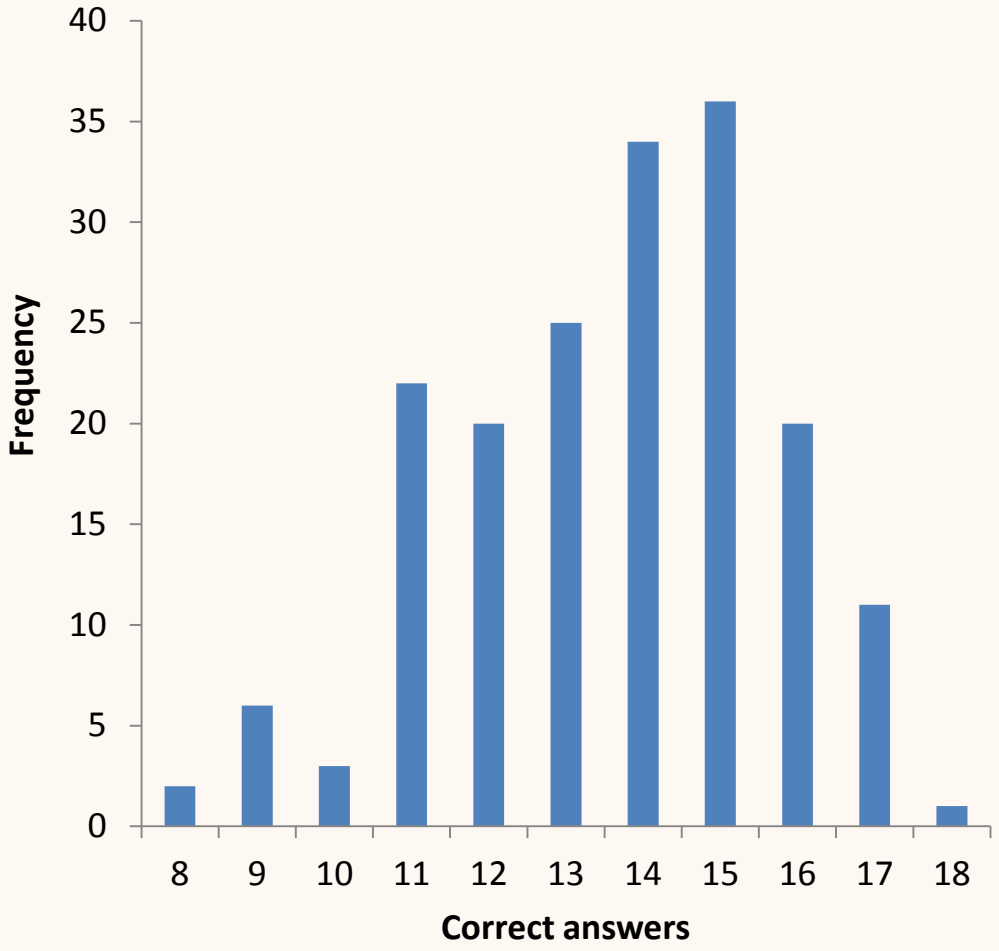
Experiment 3: Euros Calculator

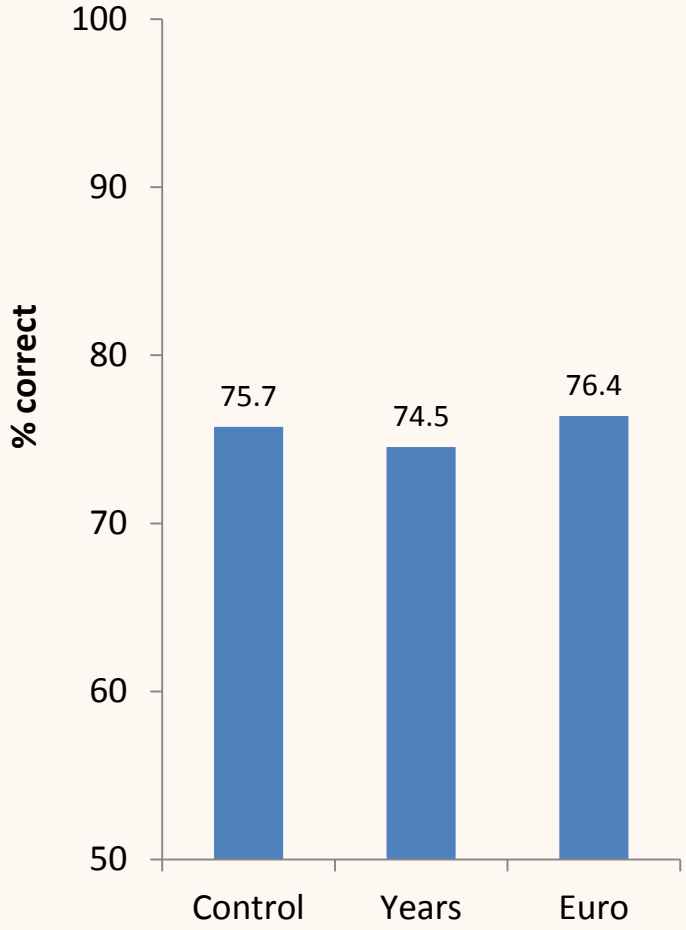
Choices

Who will have more money saved at 65?

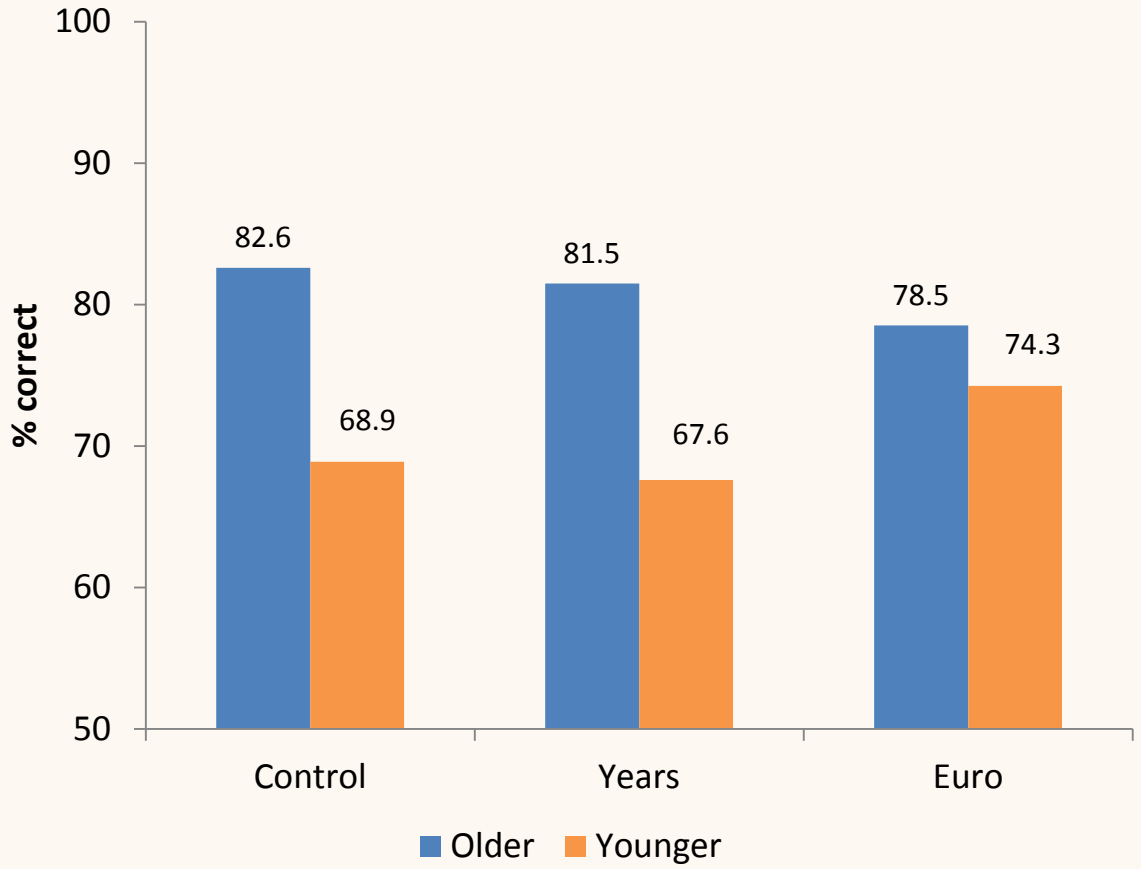
John	Charlie
Starts saving at age: 32	Starts saving at age: 44
Saves per month: €280	Saves per month: €560
More at 65	More at 65

Descriptive results: overall

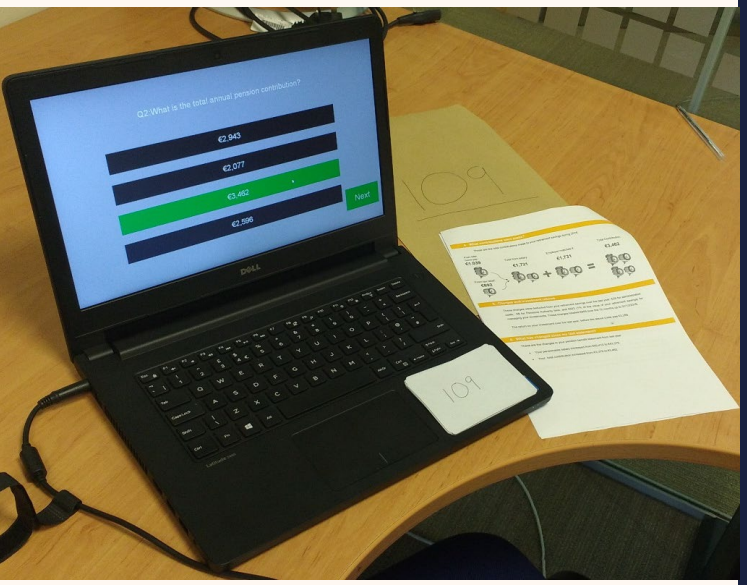




Descriptive results: EGB



Money growth conclusions



- Strong underestimation of money growth
- Especially regular savings
- Use of calculators had partial effect
  - No impact on precision of judgments
  - Euro calculator reduced bias
- Implication: “Cost of delay” more intuitive?

Overall conclusions

ARTICLE

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- Pensions are REALLY hard to understand
- Even when people are trying and incentivised
- Especially tax relief and money growth
- Diagrams help a bit
- Calculators help a bit

Further study needed

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- Test other interventions:
  - Different media?
  - Different explanations?
  - Link to learning literature: quizzes, interactive games?
- Role of money illusion?
- Role of fees and related disclosures?