

# Confidence, Aspirations, and the Efficiency and Equity of Educational Systems when Students have an Imperfect Knowledge of their Ability: an Experimental Approach

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# Motivation

We study the productive efficiency and intergenerational mobility of educational systems, with special emphasis on the sorting and screening of students by ability.

Experiment's motivation:

- Compare stylized, context-free, educational systems.
- Measure variables like performance, cognitive ability and 'non-cognitive' abilities like confidence and aspiration levels that would be difficult to observe in surveys.
- Describe individual judgments and behavior at a micro level and simulate the aggregate behavior at a macro level (a « sociological experiment »).

We design a simplified schooling system within which experimental subjects will make education-like choices.

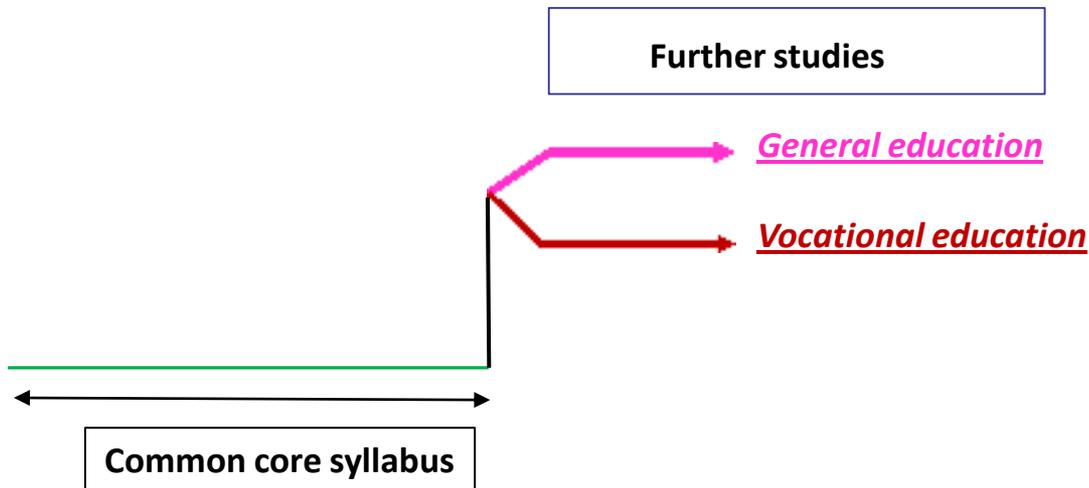
# Describing an educational system

Comparative studies (eg. Levy-Garboua, 1995) enlighten the basic structure of all schooling systems as:

**Common core syllabus:** providing general core knowledge to all individuals

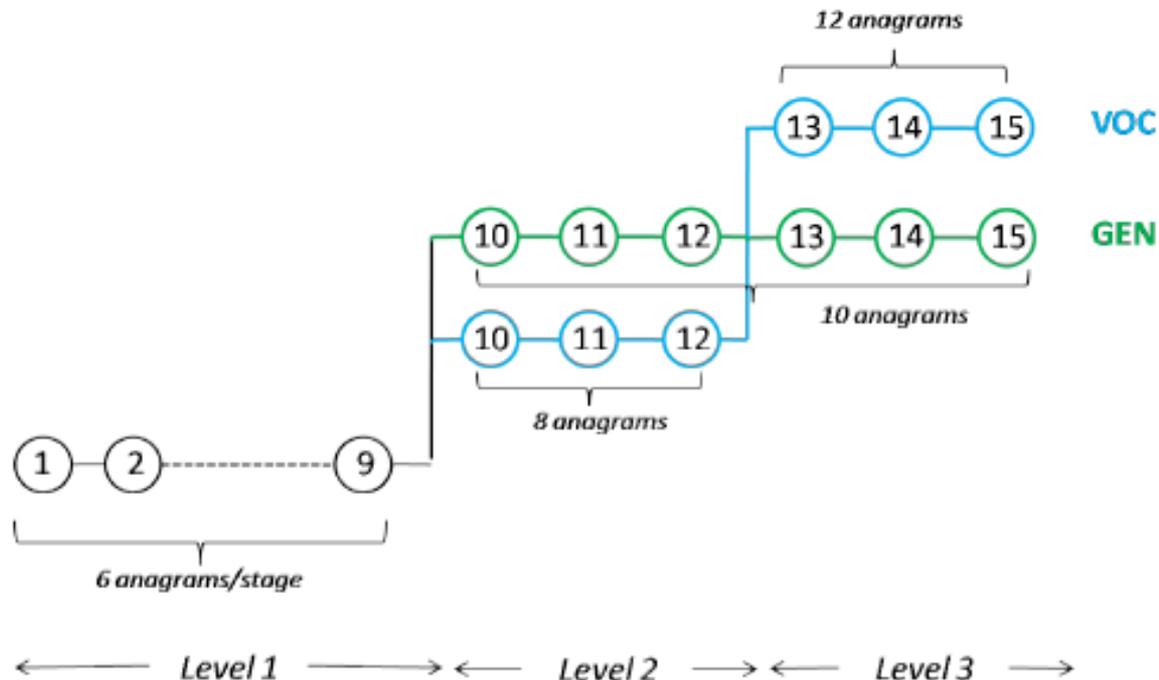
**Further studies:** followed by a choice between two curricula providing further knowledge

**Stylized design:**



# A simplified educational system

- 1 **A real effort task:** solving six letter anagrams.
- 2 **Three levels of difficulty** calibrated to obtain the same success rates we have in France and Quebec. **Every stage:** 8 minutes at most.
- 3 **Requirement for succeeding a level:** the subject has to solve at least 2/3 of the total anagrams.
- 4 **Choice between two curricula:** Vocational (VOC) and General (GEN) (subjects see A and B and the order is randomly reversed).



# Economic literature

- Investment choices over an extended period.
- Investment levels reflect productivity levels and wages.
- Returns increase with level of investment.
- Becker, 1967: Distinguishes ability differences and opportunity differences in the educational process. Low impact of the credit constraints on educational attainment (Cameron and Taber 2004, Carneiro and Heckman 2002).
- Sorting (Weiss, 1983) and screening by ability (Stiglitz 1975). Two mechanisms:
  - 1 Elimination of the less able students at increasing levels (failure)
  - 2 Self-selection of students by ability (orientation choices).
- More recently, emphasis on non-cognitive abilities (Bowles et al. 2001, Heckman and Rubinstein 2001).

# Study 1: Self-confidence

Muniza Askari and Louis Levy-Garboua

University Paris 1 (Panthéon Sorbonne) & Paris School of Economics

# Aim of the study

- We study the building of self-confidence over time, as subjects discover their own ability through experience.
- A parallel is drawn between the pattern of schooling investments and the pattern of players' decisions in the famous "double or quits" game (a modern version is "*who wants to be a millionaire*").

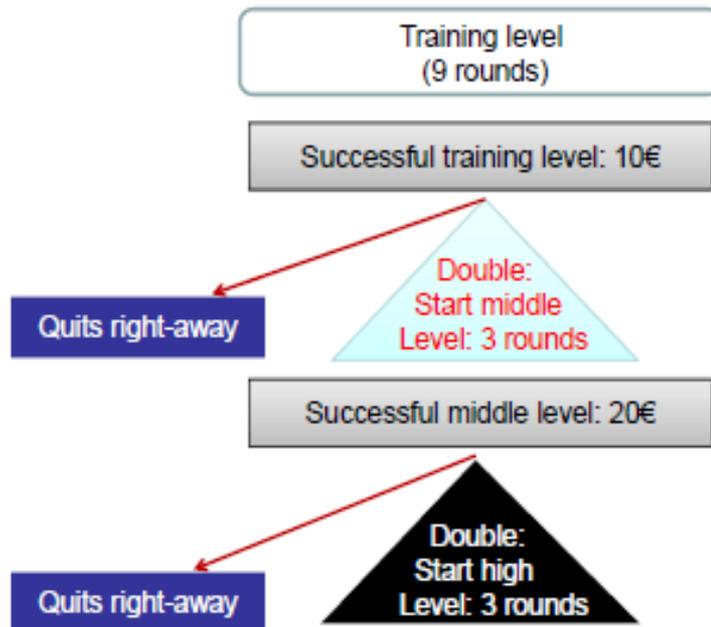
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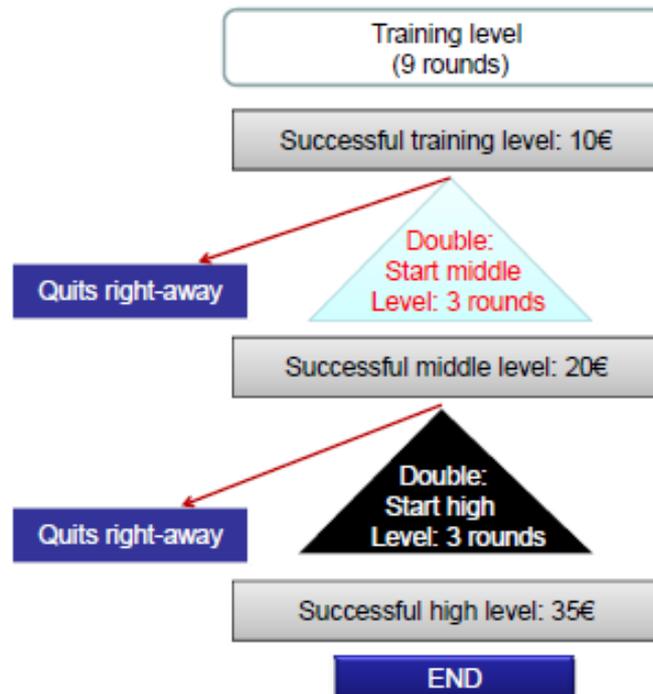
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# Confidence judgments

- Individuals are first shown a demonstration slide (one minute).
- Confidence in one's ability to reach one level is reported on three occasions: Before the start, after four rounds, and after the training level (only for doublers).
- Direct measurement of subjective confidence on a 0-100% scale (Adams 1957).

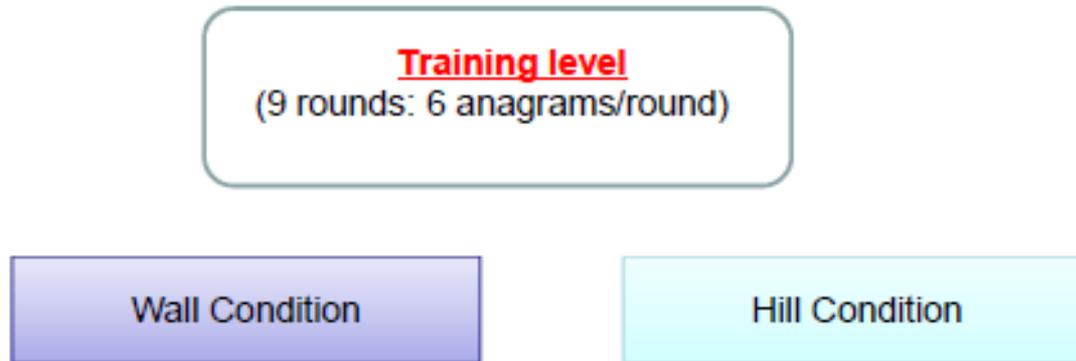
At this stage of the experiment, give your confidence of success for each level. What are your chances of success on the scale of 0 to 100?

Level 1	<input type="text"/>	%
Level 2	<input type="text"/>	%
Level 3	<input type="text"/>	%

# Treatments

**Two conditions** (*'Wall'* or *'Hill'*) after the training level for three treatments:

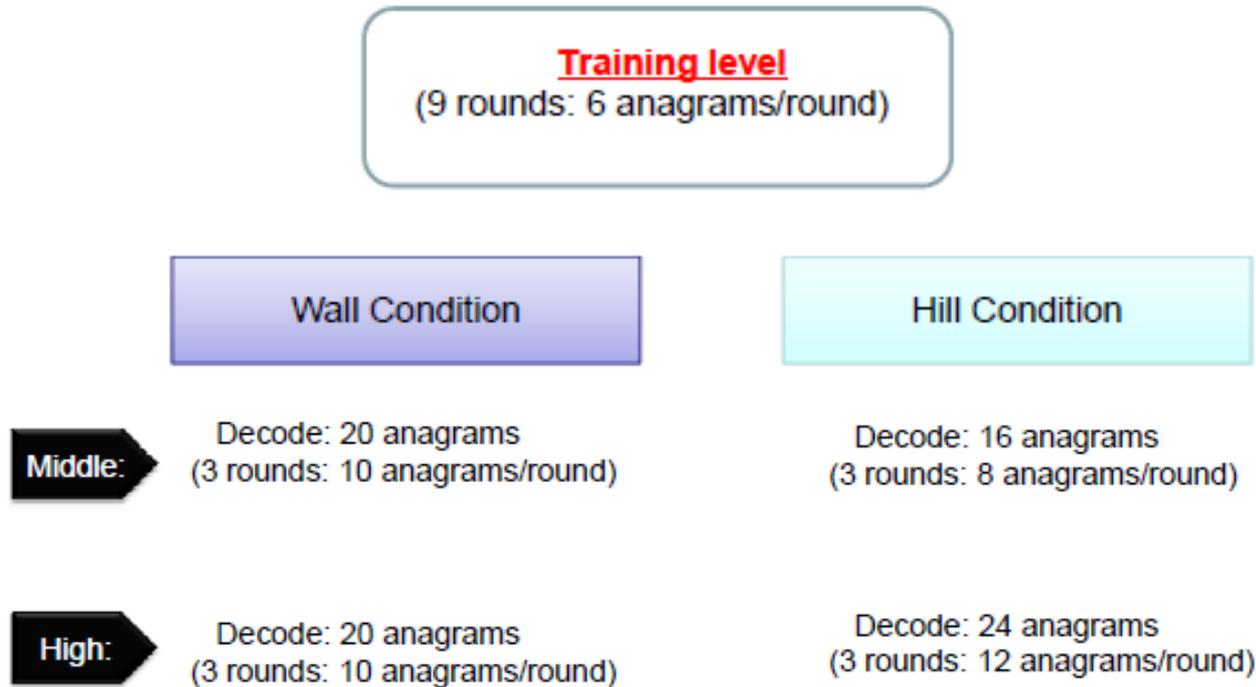
- Imposed wall treatment
- Imposed hill treatment
- Choice treatment.



# Treatments

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- Imposed wall treatment
- Imposed hill treatment
- Choice treatment.



# Descriptive results

Table : Descriptive statistics on the three treatments.

Variables	Treatments			<i>Difference</i>
	Wall	Hill	Choice	
Male	56%	48%	49%	ns
Age	24.5	25.8	25.1	ns
Risk-aversion	54%	59%	51%	ns
Payments	9.1	8.9	7.8	ns
Total anagrams solved	55	53.4	54.2	ns
Number of observations	101	106	203	
<b>Continuation decision conditional on previous level success</b>				
Middle level	78% (91)	76% (90)	77% (176)	ns
High level	95% (22)	72% (35)	82% (34)	†
Significance: 10% †; Number of participants in parenthesis.				

- No-significant difference is observed among the samples of the three treatments.
- The decision to continue into high level varies **significantly** among treatments.

# Incentives

Performance and choices are incentivized but beliefs (confidence reports) are not.

Since reported beliefs are immediately followed by observable decisions, reporting false beliefs in the presence of strong incentives to behave properly is not a credible strategy.

Moreover, incentivizing beliefs on three successive occasions within an experiment which lasted almost two hours would have been probably disturbing with respect to the main task.

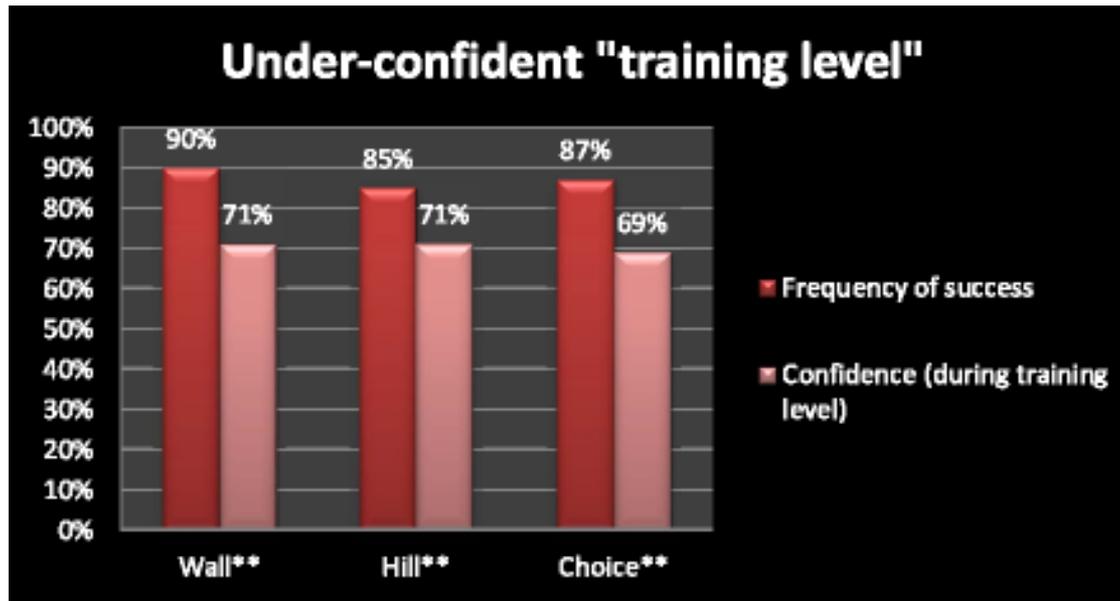
A recent comparison of this method with the quadratic scoring rule found that it outperformed the quadratic scoring rule (Hollard, Massoni, Vergnaud 2010).

# Result 1: Miscalibration (1)

(Lichtenstein et al, 1982, Healy and Moore, 2007, Fischhoff et al., 1977)

## Training level:

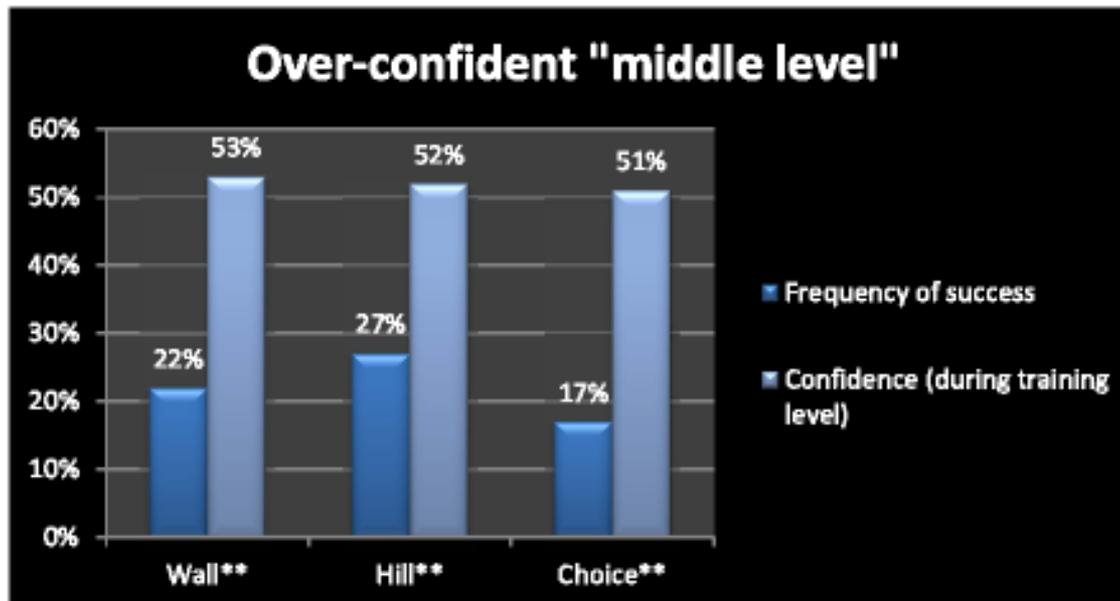
*Underestimation of performance for a novel but relatively easy task (significance: 1%)*



## Result 1: Miscalibration (2)

### Middle level:

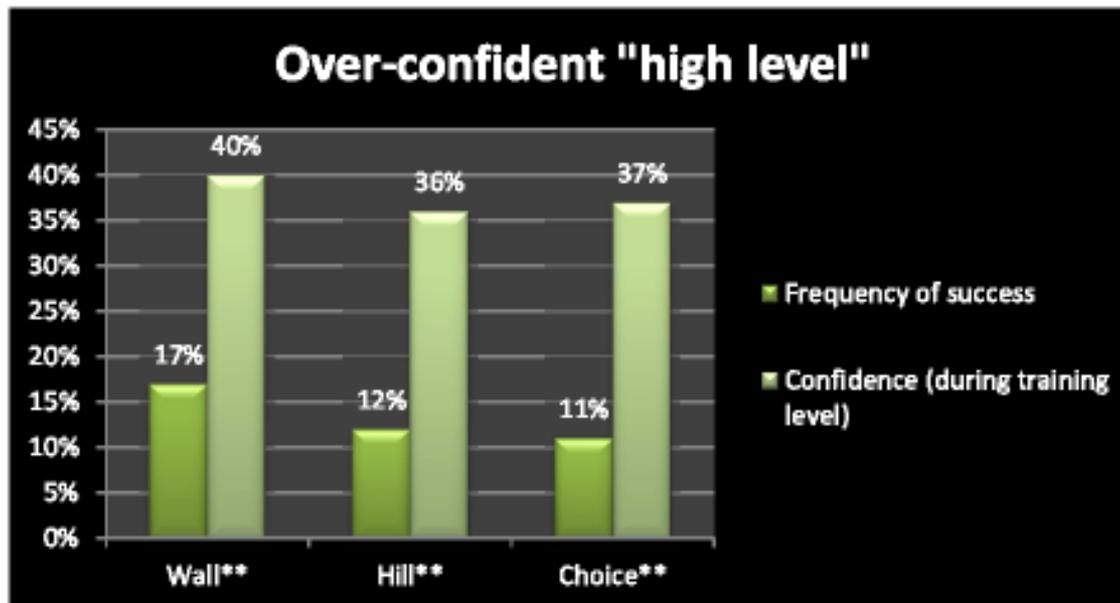
*Overestimation of performance when the task becomes difficult (significance: 1%)*



## Result 1: Miscalibration (3)

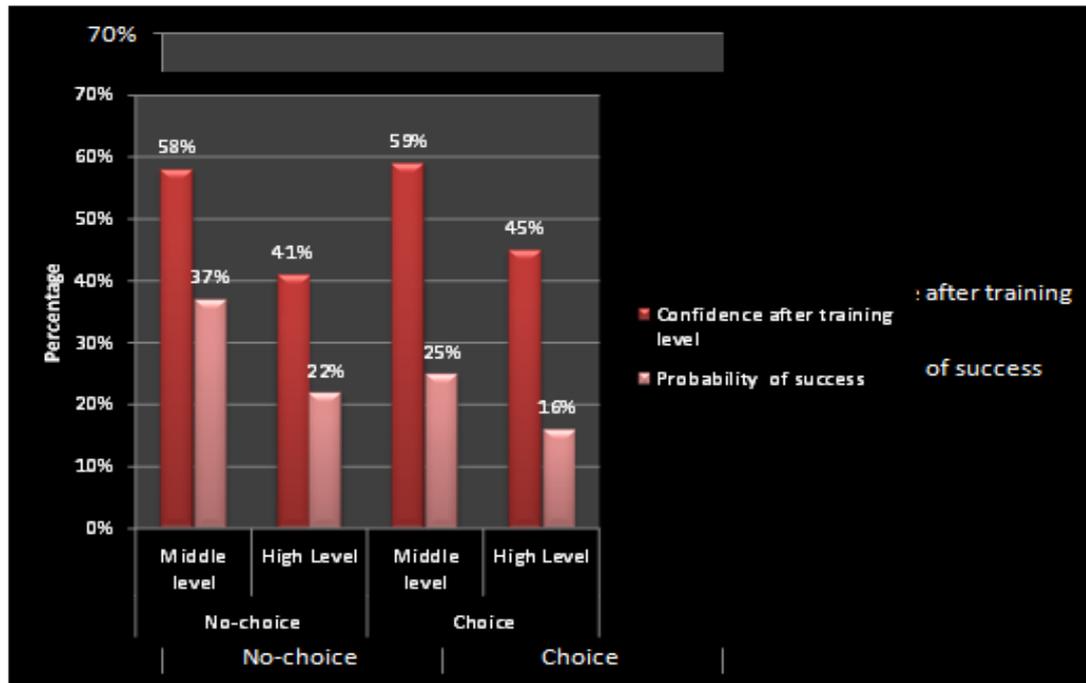
### High level:

*Overestimation of performance for a difficult task (significance: 1%). Increases with difficulty in relative terms.*



## Result 2: Unrealistic optimism towards the future.

*Conditional on an initial success (training level) and on the decision to continue, confidence remains overestimated. However, confidence does not rise in proportion to chances of success.*



Overconfidence at middle and high levels conditional on initial success and decision to double

## Result 3: Limited discrimination

*Subjects do not perceive differences of difficulty between two different tasks which cannot be compared.*

<i>Subjective confidence</i>		<b>No-choice treatment</b>		
		Wall (%)	Hill (%)	<i>Difference</i>
<b><i>Before round 1:</i></b>	<i>Level 1</i>	80	77	<i>ns</i>
	<i>Level 2</i>	62	58	<i>ns</i>
	<i>Level 3</i>	47	40	*
<b><i>Before round 5:</i></b>	<i>Level 1</i>	71	71	<i>ns</i>
	<i>Level 2</i>	53	52	<i>ns</i>
	<i>Level 3</i>	40	36	<i>ns</i>
<b><i>Before round 10:</i></b>	<i>Level 2</i>	59	56	<i>ns</i>
	<i>Level 3</i>	43	39	<i>ns</i>

*Number of observations:* Before round 1 and 5 (before round 10): 101 (71) and 106 (68) for wall and hill treatments, respectively.

*ns:* difference is not-significant at 5% level. \* Significant at 5%

A comparison of confidence for the wall and hill treatments shown separately

### Result 3: Confidence variation and effort

*Confidence in reaching the middle and high level fluctuates during the task. Subjects lost confidence during the first part of the training period while diminishing their effort, but regained exactly this loss after completing the training level and deciding to double.*

*Suggests confidence updating based on performance.*

<i>Reported ability-adjusted self-confidence (in %)</i>					
	<b>Before</b>	<i>Diff.</i>	<b>Ability-Adjusted During</b>	<b>After</b>	<i>Diff.</i>
<b><u>No-choice</u></b>					
<b>Middle level</b>	60%	**	54%	58%	**
<b>High level</b>	43%	**	39%	41%	ns
<i>N</i>	207		139	139	
<b><u>Choice</u></b>					
<b>Middle level</b>	58%	**	51%	59%	**
<b>High level</b>	42%	**	37%	45%	**
<i>N</i>	203		136	136	

Variation of self-confidence during the training period

## Result 4: When more choice may be worse than less (1)

*There is no significant effect of choice on confidence, suggesting that the option to choose the preferred path does not trigger an illusion of control.*

*However, overconfidence is increased for subjects who can choose their preferred path.*

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		Confidence	Overconfidence
<u>Middle level</u>	No-choice	58%	21%
	Choice	59%	34%
	<i>Diff</i>	ns	*
<u>High level</u>	No-choice	41%	19%
	Choice	45%	29%
	<i>Diff</i>	ns	*

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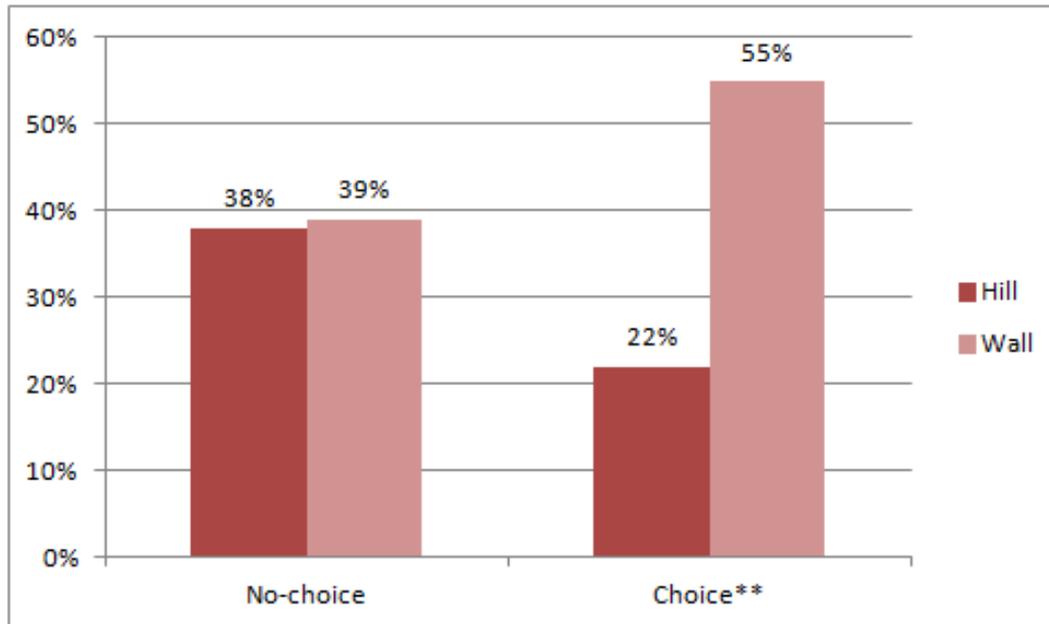
*t*-tests on differences between two sample means (two-tailed).  
Significance level: \*5%; † 10%; ns not-significant at 5% level.  
Confidence is measured for doublers after the training level

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Variation of confidence and overconfidence at middle and high level with choice of preferred path

## Result 4: When more choice may be worse than less (2)

*Subjects who can choose their preferred path overestimated their chances of future success, and opted more frequently for the more difficult path at the middle level (wall) than subjects having no choice. Thus, subjects who could choose their preferred path failed more frequently on average than those who had no choice.*



Percentage of individuals opting for the Wall or Hill path before middle level path

# Confidence building by naive Bayesians (1)

$$E_5 p = \frac{v}{v+4} E_1 p + \frac{4}{v+4} \left[ \frac{x(1)+x(2)+x(3)+x(4)}{4} \right]$$

Before round 5	Sequential evaluation of confidence		
	<u>Training Level</u>	<u>Middle Level</u>	<u>High Level</u>
Confidence before training session	0.81 (0.000)**	0.88 (0.000)**	0.92 (0.000)**
Frequency of success on rounds 1-4	0.31 (0.000)**	0.21 (0.000)**	0.16 (0.002)**
Average time per anagram solved rounds 1-4	-0.04 (0.005)**	-0.05 (0.001)**	-0.04 (0.000)**
Hill	0.03 (0.109)	0.03 (0.054)†	0.02 (0.138)
Choice	0.02 (0.158)	0.02 (0.102)	0.01 (0.416)
Constant	-0.18 (0.000)**	-0.18 (0.000)**	-0.14 (0.000)**
R <sup>2</sup>	63%	66%	73%

Significance: \*\* 1%; \* 5%; † 10%

N=410

OLS estimation of the Bayesian model of confidence before round 5

## Confidence building by naive Bayesians (2)

$$E_{10}p = \frac{v+4}{v+9+h} E_5p + \frac{5}{v+9+h} \left[ \frac{x(5) + x(6) + x(7) + x(8) + x(9)}{5} \right] + \frac{h}{v+9+h} P_{ass}$$

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### Before round 10

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	<u>Middle level</u>	<u>High level</u>
Confidence after round 4	0.76 (0.000)**	0.87 (0.000)**
Frequency of success on rounds 5-9	0.09 (0.004)**	0.07 (0.024)*
Average time per anagram solved on rounds 5-9	0.01 (0.737)	0.04 (0.064)†
Hill	-0.05 (0.005)**	-0.02 (0.235)
Choice	-0.02 (0.243)	0.02 (0.091)†
Constant	0.10 (0.001)**	-0.01 (0.702)
R <sup>2</sup>	72%	80%

Significance: \*\* 1%; \* 5%; † 10%

N=275

OLS estimation of the Bayesian model of confidence at the moment of choice of double or quits

# Confidence, choice to continue and performance

*Well calibrated confidence motivates choice to continue and performance.*

	<u>After training level</u>		<u>After middle level</u>	
	I Success training level	II Continue middle level	III Success middle level	IV Continue high level
Choice		-0.02 (0.16)	-0.33 (2.77)**	-0.58 (2.36)*
Wall				0.38 (1.85)+
Average time per anagram solved	-1.71 (6.26)**	-2.08 (7.80)**	-2.53 (7.32)**	-2.86 (4.97)**
<b>Confidence training level</b>	<b>2.21</b> (4.64)**			
<b>Confidence middle level</b>		<b>1.26</b> (3.07)**	<b>0.96</b> (5.53)**	
<b>Confidence high level</b>				<b>1.84</b> (3.04)**
Male	0.25 (1.21)	-0.05 (0.31)	0.08 (0.54)	0.27 (1.07)
Constant	1.17 (2.50)*	1.44 (3.73)**	0.12 (0.55)	0.52 (1.21)
Observations	410	357	275	191
Rho	0.727		0.999	
p-value	(0.2366)		(0.0655)+	
Log-likelihood	-244.588		-161.336	

Notes: z-values in parentheses. Significance level: + 10%; \* 5%; \*\* 1%.

# Conclusion

**Naive Bayesians** (NB) make Bayesian revisions on perceived evidence. They make myopic decisions and build self-confidence for success in the future on the mere observation of their own successes in the past.

## **Predictions:**

**Limited discrimination:** occurs because NB rely on the same cues to predict future success either in Wall or Hill in the absence of an explicit comparison between them. Thus, relative overconfidence in the more difficult task.

**Hindsight bias (Fischhoff, 1975):** upward revision of (low) prior after being shown the demonstration slide containing a few solved anagrams.

**More choice worse than less?** If overconfident NB do not perfectly know their ability, own choice of curriculum may lead to more failures than random allocation among curricula.

# Study 2: The aggregate efficiency of sorting and screening in educational systems

Muniza Askari and Louis Levy-Garboua

University Paris 1 (Panthéon Sorbonne) & Paris School of Economics

## Part 2: Aggregation of individual performances: the comparative efficiency of educational systems.

- Performance of educational systems will be compared through the distributions of subjects across levels and the average net earnings.
- **Two treatments** are added: screening and race.

# Screening treatment

- Individuals are categorized by the performance in primary level, which is assumed to indicate ability.
- Hence, out of 54 anagrams (of level 1) :
  - Low-ability subjects:** solved between 36-44 anagrams. This implies imposition of VC.
  - High-ability subjects:** solved between 45-54 anagrams. A choice among GC & VC is proposed.
- Three sub-treatments were designed:
  - Full-information (*full*):** All information regarding the low/high ability is explained.
  - Limited-information (*limited*):** instructed to solve as many anagrams as possible.
  - No-information (*no*):** no information on the low/high ability is explained.

# Screening treatment

Descriptive statistics for the three sub-treatments of screening provides the following:

	Information			
	Full	Limited	No	Difference
Total anagrams solved	60	55	54	ns
Continue Level 2	72%	68%	72%	ns
Continue Level 3	24%	17%	21%	ns
Clear Level 2 (total)	40%	26%	25%	ns
Clear Level 3 (total)	13%	06%	10%	ns
Payments	8.75	6.82	7.38	ns
Level reached	1.28	1.06	1.15	ns
Observations	40	34	39	

- Descriptive statistics reveal no difference in performance among the three treatments. Hence, they are aggregated in one sample named as *screening*.

# Race treatment

Participants are instructed to:

attain the goal of 36 anagrams the quickest possible,  
and

the first **8 participants** will be provided with the choice  
at level 2.

**Low ability subjects:** failed to attain first 8 positions.

**High ability subjects:** ranked at first 8 positions.

# Experimental sessions

Four treatments:

## Two no-selection treatments:

- **No-choice:** subjects are randomly sorted among curricula (N=133).
- **Choice:** subjects self-select their preferred curriculum (N=131).

## Two selection treatments:

- **Screening** : selection by early grades (N=113).
- **Race:** selection by early competition (N=76).

# Results

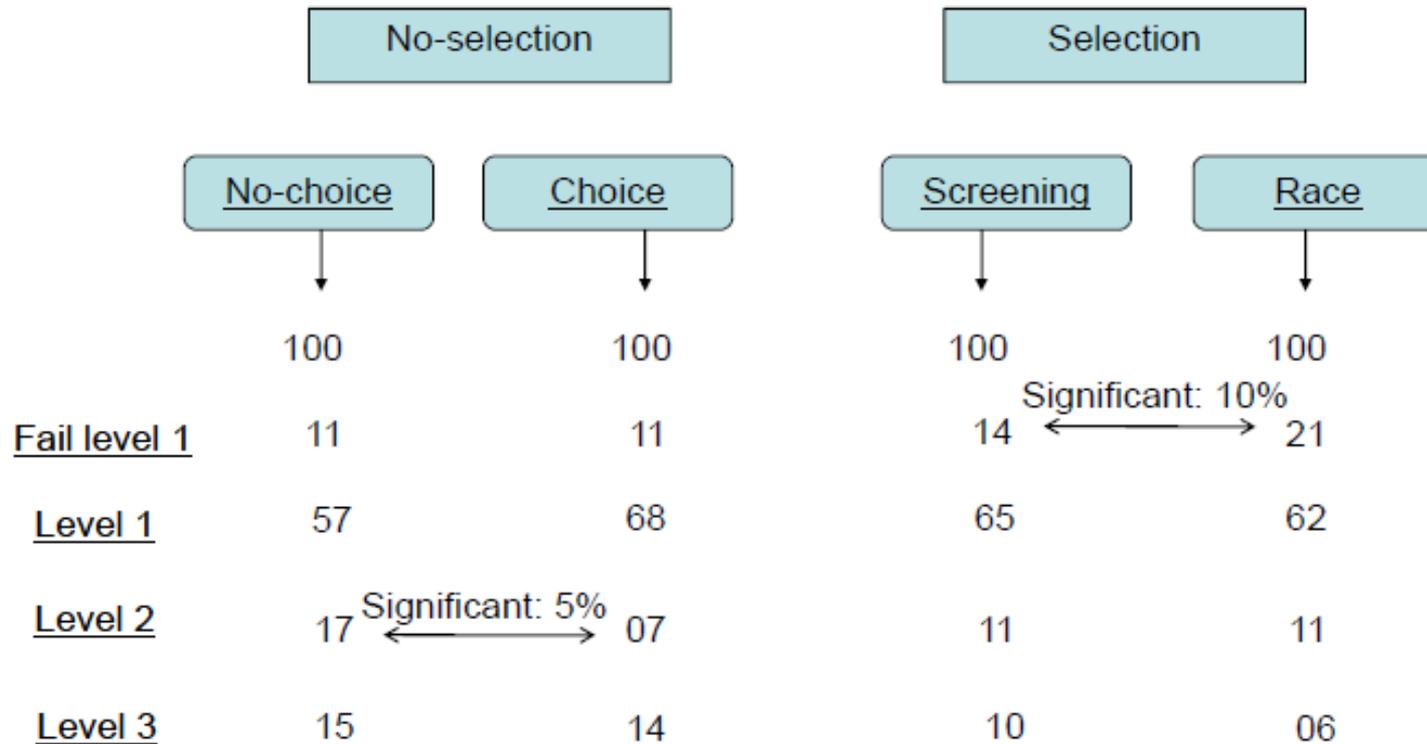
## Result 1: Selection does not perform well.

A Wilcoxon-signed ranked test shows significant difference among clearance rates at 5% for level 3.

	<u>No-selection</u> (No-choice + Choice)	<u>Selection</u> (Screening + Race)
	100	100
<u>Clear level 1</u>	89	86
<u>Continue level 2</u>	71	71
<u>Clear level 2</u>	32	21
<u>Continue level 3</u>	22	15
	↓	↓
<u>Clear level 3</u>	15	10

## Result 2: No-choice is the best and race is the worst

No-significant difference is observed among choice and screening treatment.



### Result 3: High-ability individuals perform better under no-selection treatments than under selection treatments

(Bonferroni multiple comparison test of success rate at level 3 is significant at 5% among four treatments).

*Performance by high-ability individuals (normalized to 100)*

	No-choice	Choice	Screening	Race
	100	100	100	100
<u>Fail level 1</u>	00	00	00	00
<u>Level 1</u>	41	59	72	71
<u>Level 2</u>	18	11	19	16
<u>Level 3</u>	41	30	09	13

## Result 4: Low-ability individuals perform better under screening treatment

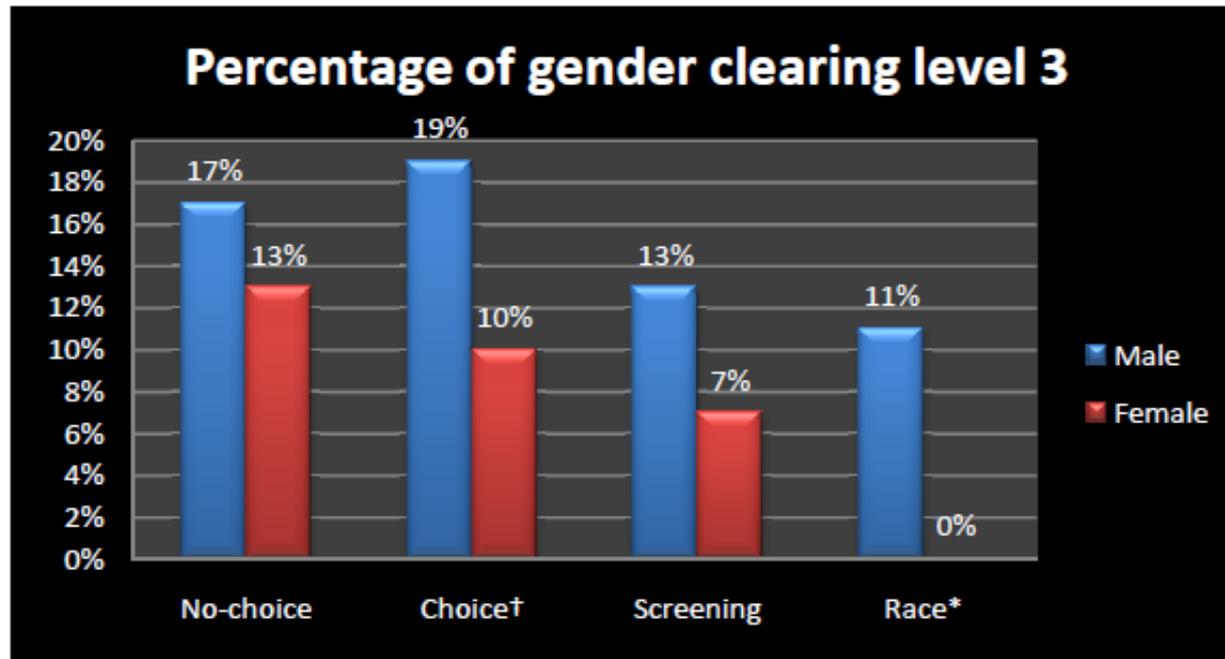
(Bonferroni multiple comparison of success rate at level 3 is significant at 10% among four treatments).

*Performance by low-ability individuals (normalized to 100)*

	No-choice	Choice	Screening	Race
	100	100	100	100
<u>Fail level 1</u>	17	19	27	35
<u>Level 1</u>	65	74	58	56
<u>Level 2</u>	16	03	05	09
<u>Level 3</u>	02	04	10	00

## Result 5: Females perform worst under the race treatment

with 0% clearance rate for level 3 (significant at 5%),  
(Niederle and Vesturlund, 2007).



# Average net earnings

**Result 6: Average net payments are highest for the no-selection treatments.**

	No-choice	Choice	Screening	Race
Earnings	1279	1148	748	519
Number of subjects	133	131	113	76
Average net earnings	9.61	8.76	6.62	6.82

# Conclusion

## Main conclusions:

- Selection is not an efficient way of sorting individuals of varying abilities into levels when individuals do not know their ability.
- Even highly-able individuals perform better under no-selection treatments.
- Females perform poorly in competitive environments

# Study 3: Intergenerational mobility

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<sup>2</sup>CIRANO

# Sociological literature

⇒ Focus on inter-generational mobility.

Are human capital investment and sorting by ability socially biased?

In addition to economic factors, four main "sociological" causes of inequality:

- Externalities
  1. Cultural transmission of knowledge and values by parents (Becker and Tomes 1979, Bourdieu and Passeron 1970)
  2. Neighborhood effects (Goux and Maurin 2006, Moizeau et al. 2008), peer effects (Markman et al. 2003, Hoxby 2000).
- Behavior
  1. Differences in aspiration across social classes (Boudon 1973, Breen and Goldthorpe 1997, Duru-Bellat et al. 2011).
  2. Differences in self-confidence across social classes (Bourdieu and Passeron 1964, Sullivan 2006).

# • Social differences in aspiration levels

- Social classes represented by their aspiration levels – + 3 treatments.
- Children from low social background consider success what children from high social background would consider as a failure.
- Aspiration levels framed as gains and losses with reference to initial endowments (Kahneman and Tversky, 1981).

Levels		Treatments		
		Gain (GT) <i>Low Class</i>	Intermediate (IT) <i>Middle Class</i>	Loss (LT) <i>Upper Class</i>
	<b>Initial endowment</b>	<b>0€</b>	<b>20€</b>	<b>35€</b>
L1 - Low group	Fail	2€	-18€	-33€
	Pass and stop	10€	-10€	-25€
L2 - Middle group	Fail	4€	-16€	-31€
	Pass and stop	20€	-0€	-15€
L3 - Upper group	Fail	11€	-9€	-24€
	Pass	35€	+15€	-0€

Initial endowments and additional gains and losses

# Social differences in self-confidence

Is self-confidence a non-cognitive ability?

Each subject reports **her perceived probability of clearing the three levels:**

- 1 At the end of stage four of level 1. Perceived probability of clearing level 1, level 2 and level 3.
- 2 Before level 2, only for subjects who succeeded level 1. Perceived probability of clearing level 2 and level 3.

Not incentivized:

- Effort is incentivized and expected gains constitute an indirect incentive to report one's perceived probability of success faithfully.
- Reporting five different probabilities at two stages (4 and 9) with a QSR (or other rules) seems very cumbersome.
- Non-significant differences were found between incentivized and non incentivized studies of confidence (e.g. Hollard et al. 2010).

# Hypotheses

- H1:** Ability is the main determinant of educational choices and success.
- H2:** (Bourdieu and Passeron, 1964) Upper class students (loss treatment) are more **confident** in their abilities than lower class students (gain treatment). Besides, greater confidence entails greater performance (to some extent).
- H3:** (Boudon, 1973) Upper class students (loss treatment) have higher levels of **aspiration** than lower class students (gain treatment). Besides, higher aspirations entail high performance through the pursuit of studies.
- Question:** What about the middle class (intermediate treatment)?

# Descriptive statistics

- 14 sessions in Paris and Montréal.
- 243 participants (120 women, 123 men). Mean age: 26.8 years.

Variables	Modality	difference
Gender	Men	ns
Age		ns
Level attained		ns
Mother tongue	French	**IT≠LT **GT≠LT
Prior participation in an experiment	Yes	ns
Educational level	Bac +3 to bac+5 or more	ns
Occupation	Work or study	ns
Risk Aversion	Yes	**GT≠IT
Cross words	Occasionally or regularly	ns
Scrabble	Occasionally or regularly	**IT≠LT ***IT≠GT
Number of comprehension mistakes		ns
Stress	scale from 1 to 7	ns

Significance levels of t-test: \*\* 5% \*\*\* 1%

# Individual success

Relegated into lower group  
(probit on passing L1 or less)

VARIABLES	
Intermediate Treatment	0.186 (0.254)
Loss Treatment	-0.004 (0.252)
Ability 2	1.065*** (0.296)
Ability 3	1.395*** (0.291)
Ability 4	2.401*** (0.374)
Confidence for level 1	-0.010 (0.007)
Confidence for L2 (end of stage 4)	-0.019 (0.012)
Confidence for L3 (end of stage 4)	0.010 (0.008)
Men	-0.262 (0.212)
Constant	0.852 (0.755)
Control	Yes
N	243
R <sup>2</sup>	0.37

Attaining upper and middle group  
(probit on passing L2 or more)

VARIABLES	
Intermediate Treatment	0.361 (0.325)
Loss Treatment	0.202 (0.306)
Ability 2	-0.966*** (0.354)
Ability 3	-1.875*** (0.382)
Ability 4	-1.516*** (0.503)
Confidence for L2 (end of stage 9)	0.045*** (0.014)
Confidence for L3 (end of stage 9)	-0.031*** (0.012)
Men	0.508* (0.266)
Chose VOC	1.043*** (0.302)
Constant	-0.934 (0.845)
Control s	Yes
N	173
R <sup>2</sup>	0.35

# Result 1: Individual success' determinants

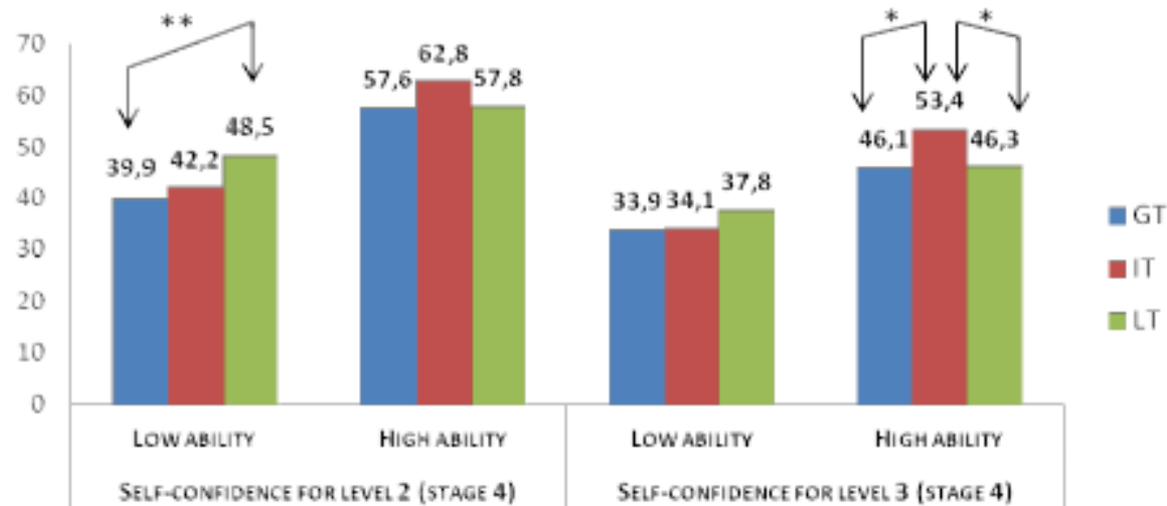
- Ability is the main determinant of failure: it plays the role of a selective factor that eliminates the weakest participants in the task.
- Success is determined by ability and a moderate self-confidence.
- Being over-confident decreases the probability of success.

# Intergenerational mobility in the aggregate society

	Lower group (L0-L1)	Middle group (L2)	Upper group (L3)
Lower class (GT)	51.3%	22.5%	26.3%
Middle class (IT)	48.8%	12.2%	39.0%
Upper class (LT)	51.8%	22.2%	26.0%

- No difference of inter-generational mobility between lower and upper classes.
- Comparison made with French data (Sénat report, 2008) where the lower class is less mobile than the upper class.  
⇒ Differences in opportunities and social externalities are the main factors of inter-generational inequalities.
- However, more than average upward mobility in the middle class ( $p=0.04$ ).

## The effect of social class on self-confidence: Testing Bourdieu and Passeron's th. (H2).



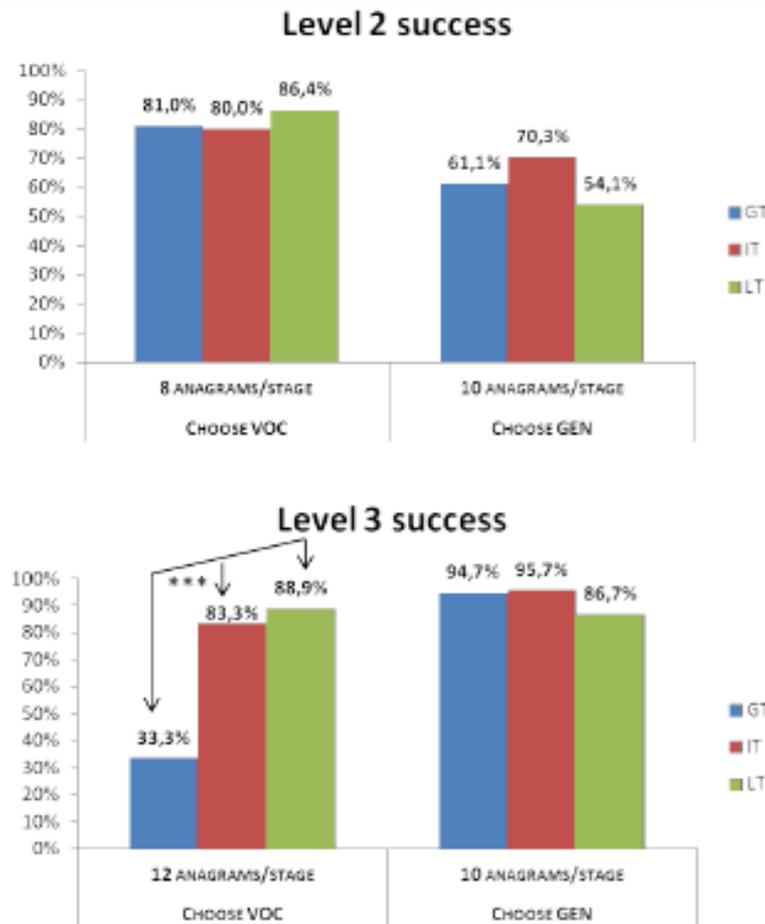
Self-reported confidence for succeeding in each level by ability and treatment.

### Result 2:

- ⇒ Upper class subjects are significantly more confident than lower class subjects, but only among low performers.
- ⇒ Middle-class subjects with low ability experience a negative performance surprise and behave like lower class subjects. Whereas high ability, middle-class subjects experience a positive performance surprise.

$$\text{Confidence} = f(\text{class}, \text{ability})$$

## Higher aspirations induce higher levels of effort: Testing Boudon (H3)



**Result 3:** Aspirations increase when subjects perform beyond their initial reference level, and higher aspirations induce higher level of effort.

## • Evidence of a "middle class effect"

- Overall, the middle class enjoyed more upward mobility than the other classes.
- However, this **aggregate** effect masks two opposite trends stemming from the fact that differences in aspirations (that reflect social classes) **interact** with ability.

		Lower group (L0-L1)	Middle group (L2)	Upper group (L3)
Low ability	Lower class (GT)	71,4%	14,3%	14,3%
	Middle class (IT)	80,6%	8,3%	11,1%
	Upper class (LT)	72,7%	18,2%	9,1%
High ability	Lower class (GT)	28,9%	31,6%	39,5%
	Middle class (IT)	23,9%	15,2%	60,9%
	Upper class (LT)	27,0%	27,1%	45,9%

# Results 4 and 5: the IT distinguishes the success of low and high ability subjects.

Relegated into lower group  
(probit on passing L1 or less)

VARIABLES	Low ability	High ability
Intermediate Treatment	1.168*** (0.422)	-0.408 (0.381)
Loss Treatment	0.488 (0.397)	-0.219 (0.361)
Ability 2		1.198*** (0.321)
Ability 4	1.720*** (0.414)	
Confidence for level 1	-0.008 (0.011)	-0.014 (0.011)
Confidence for L2 (end of stage 4)	-0.046** (0.020)	-0.036 (0.024)
Confidence for L3 (end of stage 4)	0.024* (0.014)	0.028 (0.018)
Men	0.288 (0.565)	-0.601 (0.506)
Constant	2.056* (1.182)	1.551 (1.211)
Control	Yes	Yes
N	122	121
R <sup>2</sup>	0.4	0.3

Robust standard errors in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Attaining upper and middle group  
(probit on passing L2 or more)

VARIABLES	Low ability	High ability
Intermediate Treatment	-0.788 (0.562)	1.094*** (0.419)
Loss Treatment	-0.364 (0.456)	0.444 (0.425)
Ability 2		-1.199*** (0.374)
Ability 4	0.049 (0.570)	
Confidence for L2(end of stage 9)	0.080** (0.032)	0.034* (0.019)
Confidence for L3(end of stage 9)	-0.044* (0.025)	-0.026 (0.017)
Men	0.391 (0.828)	1.429** (0.620)
Chose VOC	1.114** (0.528)	1.549*** (0.529)
Constant	-4.529*** (1.635)	-0.997 (1.347)
Control	Yes	Yes
N	63	110
R <sup>2</sup>	0.42	0.41

Robust standard errors in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

# Concluding remarks

- First finding is that differences in opportunities and social externalities are the main factors of inter-generational inequalities.
- But our sociological experiment synthesizes other factors that impact inter-generational inequalities: abilities, aspirations and self-confidence.
- Aspirations and self-confidence have an effect on performance. However, we only partially replicate the predictions of Boudon, Bourdieu and Passeron.
- By introducing a third class we find a "middle class effect":
  - Low-ability-middle-class subjects experience a negative performance surprise and behave like lower class subjects.
  - High-ability-middle-class subjects experience a positive performance surprise and even outperform upper class subjects.
- Thus, we can explain why the middle class is more inter-generationally mobile.

**Thank you!**