

# **REDUCING THE GENDER GAP IN THE WILLINGNESS TO COMPETE BY IMPLEMENTING COGNITIVE REMEDIES TO OVERCONFIDENCE**

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# Theoretical Background

**Why  
choosing this  
topic?**

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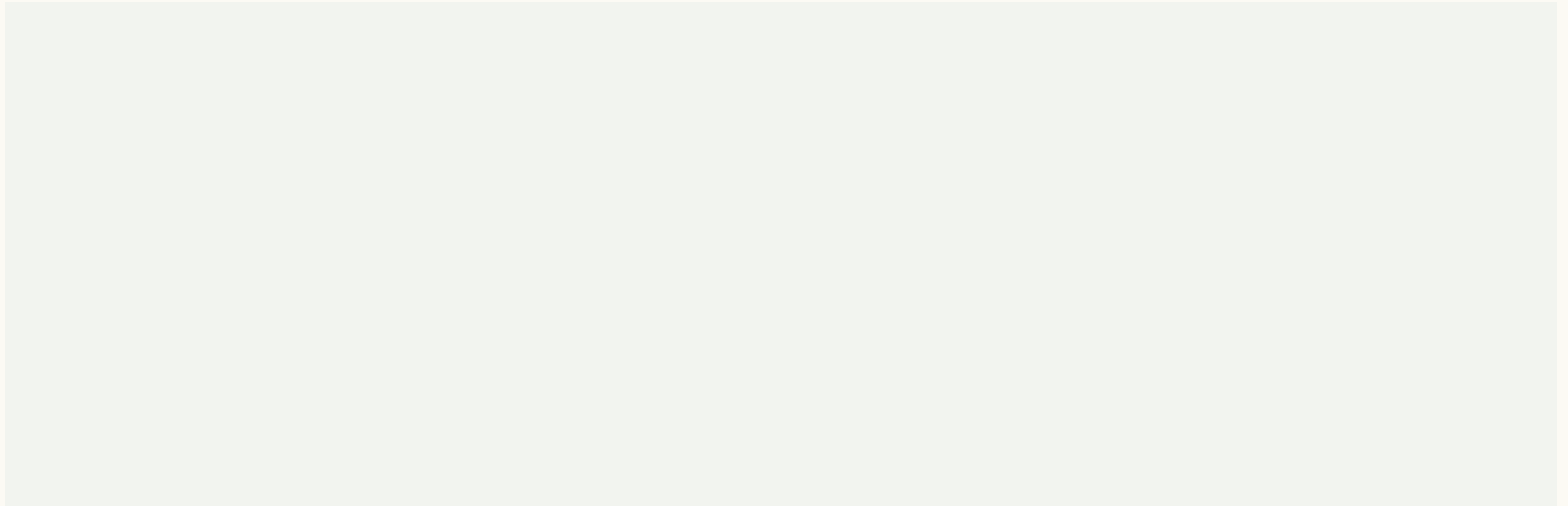
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Recent attention for the role of psychological  
attributes with a major finding:

**Men and women differ in the way they  
respond to competitive environments  
(Niederle, 2003, 2007).**

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Gender differences in WTC can contribute to explain gender gap of outcomes on the labor market

# Gender and WTC - Main findings



**Men compete too much** (Nierdele and Versterlund, 2007)

**Experimental measures of WTC predict the selection into more challenging educational tracks** (Zhang, 2013, Buser et al., 2017) and **correlate with labor market outcomes** (Buser et al., 2020)

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Results replicated in **field experiments** using real labor market choices (Flory et al., 2015, Samek, 2019).

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The gender gap in WTC is rather a manifestation of gender differences in risk attitudes and overconfidence, than the effect of a separate competitiveness trait.



Better to focus on interventions targeting **overconfidence** and risk attitudes

# Overconfidence:

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Gender Differences in  
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Being more overconfident, men are more optimistic about their chances of success, which could in turn make them more likely to choose the tournament.



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Being more overconfident, men are more optimistic about their chances of success, which could in turn make them more likely to choose the tournament.

Van Veldhuizen (2016): account for 48% of the gender gap in WTC

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It can be desirable to decrease overconfidence to increase gender parity.

# Overconfidence:

## How to decrease it in competitive set-ups?

👉 Using **less stereotypically male task** (Grosse *et al.*, 2014; Shurchkov, 2012)

👉 **Providing performance feedback** (Ertac and Szentes, 2011; and Wozniak, *et al.* 2014)

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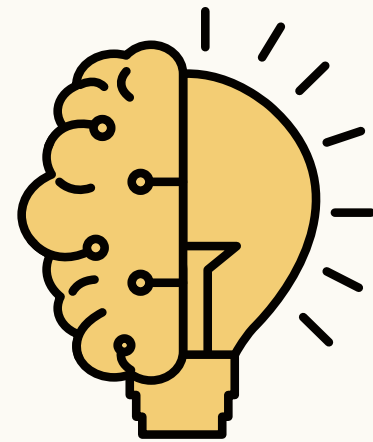
👉 **Providing performance feedback** (Ertac and Szentes, 2011; and Wozniak, *et al.* 2014)



May not be implementable in all contexts +  
effect might fade over time

# Research Project

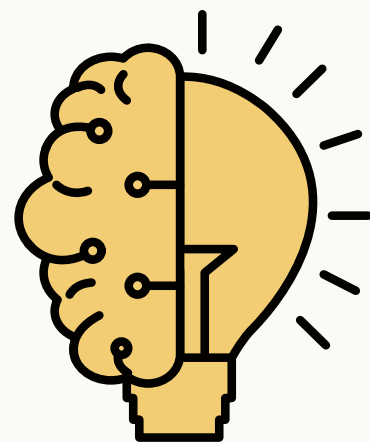
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An idea: **Could Overconfidence be Managed Through Enhanced Metacognition?**





# Metacognition:

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## What is it?

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**Adults with good metacognitive skills: better problem-solvers, decision makers and critical thinkers**

👉 Important to “flex cognitive muscles” by consciously applying appropriate metacognitive skills

👉 Possible to produce better decision makers by teaching metacognitive skills. (Bransford et al., 1986; EwellKumar, 1999; Heath, 1983)

**Metacognition  
to improve  
decision-making  
when considering  
competition entry**

Back to our problem: men tend to be more  
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Boosting metacognitive skills could allow to improve all participants decision-making in the laboratory, but more specifically men's DM since they are more prone to overconfidence. This could reduce the gender gap in overconfidence.

# Metacognition to improve decision-making when considering competition entry

Back to our problem: men tend to be more overconfident than women and to enter competition too often



Boosting metacognitive skills could allow to improve all participants decision-making in the laboratory, but more specifically men's DM since they are more prone to overconfidence. This could reduce the gender gap in overconfidence.



Since we expect the gender gap in overconfidence to be a main driver of the gender gap in the WTC, we could then expect the latter to be significantly reduced.

# Metacognition:

## How to boost it to reduce overconfidence?

### Psychology literature:

☞ experienced based interventions

☞ Interventions relying on a set of activities leading to reduce biased thinking: **the KAAR Framework (Rusmana et al. 2020)** was proven to be effective to decrease overconfidence in educational setup.

*A related (but different) example in the economic literature: Kessel et al. (2021)*

# Metacognition:

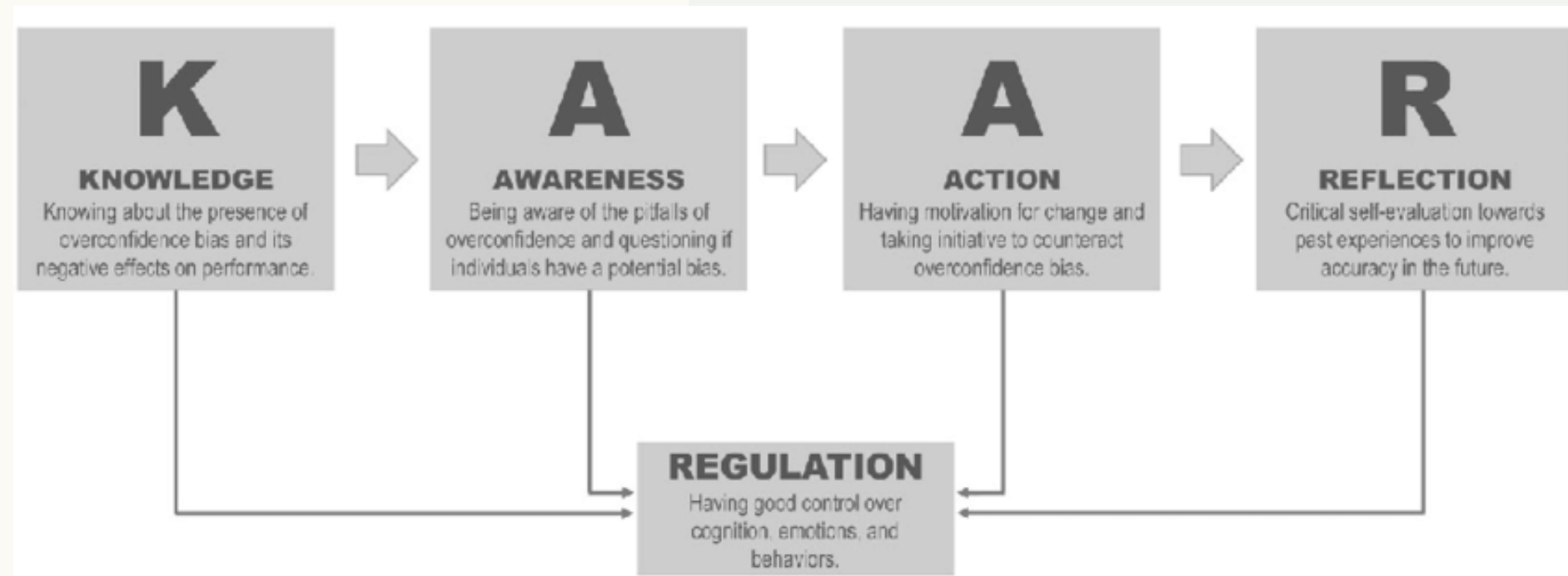
## Zoom of the KAAR framework (Rusmana *et al.* 2020)

**Knowledge:** knowing about the overconfidence bias and its implications

**Awareness:** putting thought and self-questioning to determine whether one has a potential bias

**Action:** having the willingness to debias overconfidence

**Reflection:** adopting reflective thinking



Sources: **Knowledge:** Aczel *et al.* (2015), Babcock and Loewenstein (1997), Fischhoff (1982); **Awareness:** Croskerry *et al.* (2013), Mair *et al.* (2014), Morewedge *et al.* (2015), Shepperd *et al.* (2018); **Action:** Croskerry *et al.* (2013), Kahneman *et al.* (2011); **Reflection:** Croskerry (2003), Evans (2008), Hacker *et al.* (2009), Lyons and Zelazo (2011), Zimmerman *et al.* (2011); **Regulation:** Heikkilä and Lonka (2006), Pintrich (2000), Zimmerman (2000).



# Metacognition:

**How could the KAAR framework be transferred in a laboratory set-up to decrease overconfidence?**

**Knowledge:** providing simple info about the overconfidence bias and its detrimental implications

**Awareness:** asking Ps to remember one situation in which they fell prey to this bias or were victims of someone else's overconfidence

**Action and Reflection:** Encouraging Ps to counteract their bias by fostering reflective thinking: *Make Ps state reasons why they could inaccurately judge their own ability compared to others*

## Research Questions

**To what extent can enhancing metacognition reduce overconfidence in the laboratory? Does it contribute to mitigate gender differences in overconfidence?**

**Does it impact the gender gap in the willingness to compete?**

# Hypotheses

1

We expect the intervention to decrease overconfidence, more specifically

⇒ we expect a 'general' decrease in overconfidence in the sample

⇒ we expect men to experience a larger decrease in overconfidence than women (conditional on the fact that they initially have higher overconfidence than female participants)

⇒ and we therefore also expect the gender gap in overconfidence to decrease

⇒ *we expect underconfident women to also benefit from the intervention*

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⇒ *we expect underconfident women to also benefit from the intervention:*

2

As we assume the gender gap in overconfidence to be a main driver of gender differences in the WTC, we concurrently expect the intervention to decrease the gender gap in the WTC

# Contribution

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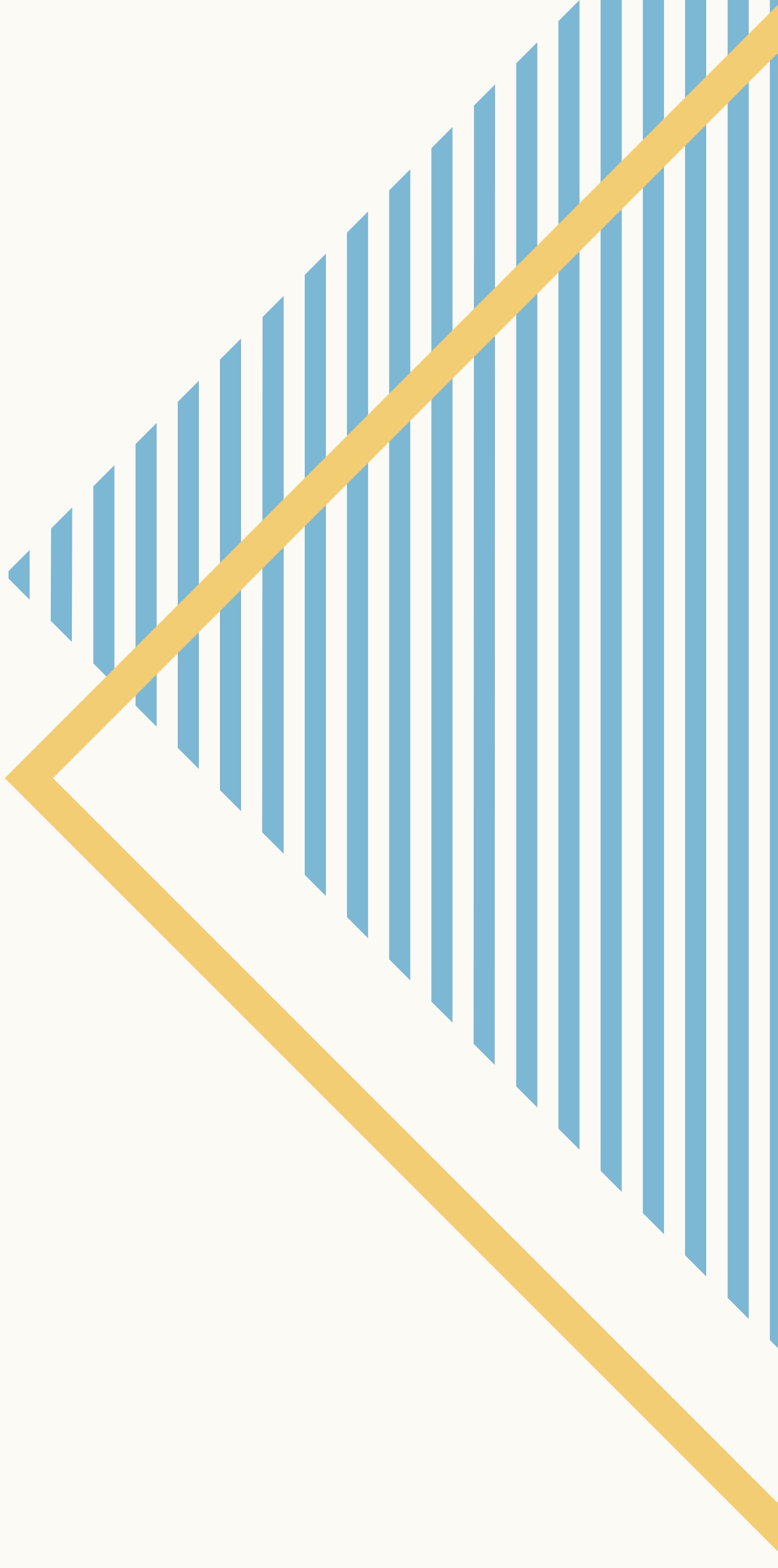
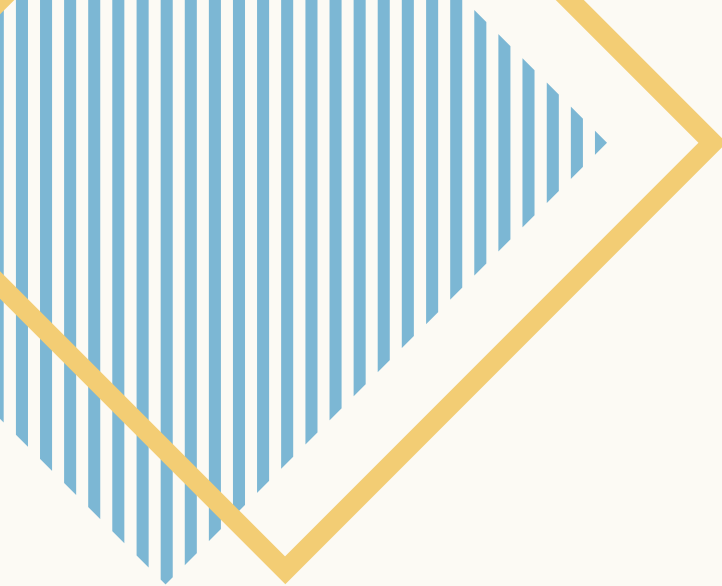
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- No laboratory experiment trying to decrease gender gap in WTC by implementing cognitive remedies to overconfidence
- Longer-term effects than simple feedback or advice
- Applicable in a lot of settings
- Metacognitive abilities transferable to a lot of domains



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- No laboratory experiment trying to decrease gender gap in WTC by implementing cognitive remedies to overconfidence
- Longer-term effects than simple feedback or advice
- Applicable in a lot of settings
- Metacognitive abilities transferable to a lot of domains
- Answer the call for more cognition-oriented research in economics



**(Tentative)**  
**Experimental Design**

# Experimental Design

## First part of the experiment

(based on Nierdele and Versterlund (2007))

4 minutes to solve problems consisting of adding 5 randomly drawn numbers.

**Step 1:** Piece-rate. Receive a fixed payment for each correctly solved sum.

**Step 2:** Competition against another participant. Receive payment (higher than in task 1) if outperform the opponent, no payment otherwise.  
+ **measure of overconfidence** (cf later)

**Step 3:** Get to choose which of the two previous payment schemes they prefer for the third task. Immediately after they choose: **intervention based on the KAAR framework.**

**Step 4:** Ps reminded of their initial decision and asked whether they would like to confirm or change.

# Experimental Design

## Zoom on the intervention

**Knowledge and awareness:** short text about the overconfidence bias and its detrimental consequences (on life outcomes and earnings)

**Awareness:** Asked to remember a situation in which they fell prey to this bias, or were victim of someone's else biased judgement/thinking

**Action and reflection:** "You have been offered the chance to compete, can you think of 2 reasons why you could inaccurately estimate your chances of winning compared to others?"

Aim: lead Ps to think about their own bias and to improve their decision-making,

*Could be twofold: men should compete less if they realize they are overconfident but also, women should compete more if they realize they are underconfident.*

# Experimental Design

## Measuring overconfidence

Ask Ps to estimate their **ability relative to a comparison sample of 20 participants** who took part in an earlier competitiveness experiment.

How to elicit truthful report? Responses incentivized using the crossover method (Karni, 2009; Mobius, et al, 2013).

*2 measures of overconfidence: after the first competitive task and at the end of the experiment, to evaluate whether overconfidence decreased after the intervention.*

# Experimental Design

## Controlling for risk attitudes and competitiveness

**Measure of risk preferences:** choices between fixed payments and lotteries, proba of winning the lottery would vary from 5% to 100% in increments of 5 % points..

Size of the payment would depend on Ps performance in previous task to ensure that the stakes are similar to the stakes from previous tasks.

**Measure of competitiveness:** *The Competitiveness Questionnaire (CQ), The Competitiveness Index (CI)?*

# Experimental Design - overview

1

## Competition

Tasks in Niederle & Vesterlund (2007):

- i) piece rate
- ii) tournament + **measure of baseline overconfidence**
- iii) choice of payment scheme:
  - ☞ **Treatment:**
  - (☞ Control group)
- iv) Ps asked whether they would like to confirm or change their decision

2

## Control for risk attitudes and competitiveness

- ☞ Choices between payment and lotteries
- ☞ Questionnaire

3

## Second measure of overconfidence



# Results





# Empirical strategy

## **Effect of the intervention on overconfidence**

⇒ as a within-subject treatment effect by comparing overconfidence prior and after the intervention

⇒ as a between-subject treatment effect by comparing overconfidence among treated vs. non-treated

## **Effect of the intervention on WTC**

⇒ as a within-subject treatment effect by comparing tournament entry decisions pre-intervention and post-intervention.

⇒ as a between-subject treatment effect by comparing tournament entry among treated vs. non-treated

# Hypothesized Results (1/2)

## 👉 Effect of the intervention on overconfidence

⇒ within-subject: decrease in male Ps' overconfidence, which would decrease the gender gap in overconfidence over the whole sample (+ *maybe decrease in underconfidence among female Ps*)

⇒ between-subject: less overconfident male Ps among treated vs control, which would decrease the gender gap in overconfidence over the whole sample (+ *maybe decrease in female underconfidence among treated vs control*)

# Hypothesized Results (2/2)

## 👉 Effect of the intervention on WTC

⇒ within-subject: reduced number of male Ps entering competition post-intervention, which would lead to a decrease in the gender gap in WTC (+ *maybe more underconfident women entering competition post-intervention*)

⇒ between-subject: less male Ps enter competition among the treated compared to the control, which would lead to a decrease in gender gap in tournament entry (+ *maybe more underconfident women entering competition among the treated vs control*)

# Anticipated issues

👉 not clear cut what the effect of the intervention on women would be: would they be unaffected (since they are expected to not be overconfident)? Would they see their confidence decrease even more? Could it be beneficial for them too, if improved metacognitive skills allow them to more accurately assess their own capacities, and therefore compete more often if they happened to be underconfident? more attention should be put on that issues in next steps

👉 interaction between risk attitudes and overconfidence: changing the level of overconfidence, could simultaneously increase the importance of risk attitudes.



**Thanks for your  
attention!**

