



## Background

French learners are affected by:  
 -maths anxiety (PISA, 2012),  
 -low maths performance (TIMSS, 2020)  
 -indiscipline in classrooms (PISA, 2019)  
 -social inequality (PISA, 2015)

Participants are in schools of socially and economically disadvantaged areas in the suburb of Paris (REP)

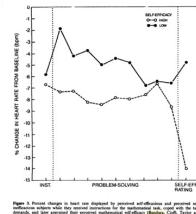


## Maths anxiety

«Feeling of tension, apprehension, or fear that interferes with math performance.»  
*Ashcraft*

## Maths self (in)efficacy

People's beliefs about their (in)capabilities to produce designated levels of performance in mathematics.  
*Bandura*



## Maths resilience

«Quality by which some learners approach mathematics with agency, persistence and a willingness to discuss, reflect and research.»  
*Lee & Johnston-Wilder*

## Maths coping skills

Cognitive process to respond effectively to a mathematical situation qualified as challenging or dangerous.  
*Lazarus & Folkman*

## Maths perezhivanie

Intense lived through maths experience that can be a filter for future situations.  
*Vygotsky*

## Research questions

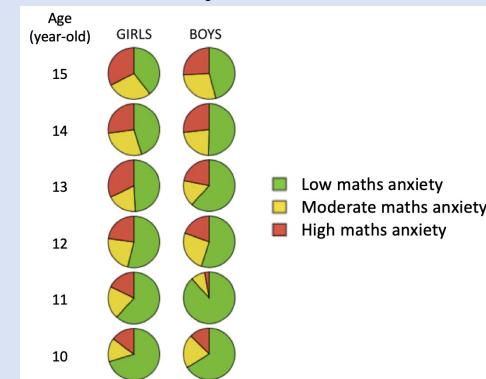
**RQ1:** What is the level of mathematics anxiety in disadvantaged areas amongst students from 10 to 15 years of age?

## Methodology

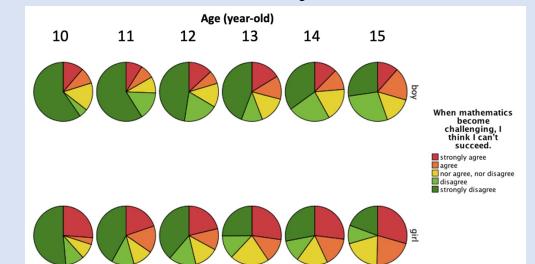
A paper-based students' survey to measure MA (MAS; Betz, 1978) and maths self-inefficacy with participants aged 10-15 (N=1902) in disadvantaged areas in Paris.

## Findings

### Maths anxiety



### Maths self-inefficacy



**RQ2:** How can a whole class intervention address mathematics anxiety and develop mathematical resilience for students in secondary schools in disadvantaged areas in France?

A design-based approach to design a whole-class intervention, based on three tools (Johnston-Wilder *et al.*, 2018). 3 cycles. Interviews and pre-and post-intervention surveys (MAS; Betz, 1978) were used to measure the impact on MA (N=120).



The intervention had a visible impact on dropping out and more able learners. The impact is positively correlated with the initial math anxiety score. The intervention was more effective for first years of secondary.



The 3 tools

**Maths resilience grid**

I think about a maths moment, in the present, the past or the future

When is it? Where? What happens?

What am I thinking? What am I doing?

What am I feeling? What is my emotion?

A little  Moderate  A lot

danger (red)  learning (yellow)  comfort (green)  boring (blue)

I decide to prefer the learning zone, I choose to think:

To reach (or stay in) the learning zone, I can list 3 things I can do:

I circle the action I choose...

The maths resilience grid of the final version

**RQ3:** Which situations may have contributed positively or negatively to learners' mathematical perezhivanie?

Stories of best and worst memorable maths moments were collected (N=100)

### Potential contributions to maths perezhivanie

	Situations	Emotions	Main thought	Zones
positive	good marks, success, teacher, student-centred pedagogy	joy, confidence, interest, happiness, pride, surprise	(maths) self-efficacy	
negative	bad marks, difficulties, tests, teacher, maths-centred pedagogy	anger, fear, disgust, sadness, surprise	(maths) self-inefficacy	

Some learners reported potential maths traumas: verbal abuse, punishment, mockery.

## Conclusion

High maths anxiety is prevalent in disadvantaged areas in France and an intervention was designed to address maths anxiety and develop maths resilience. Learning maths triggers a wide range of emotions, sometimes intense and unpleasant. The affective domain should be added to teachers' training in France. This study could help maths education become more effective and inclusive.