



Gender patterns in mathematics achievement in the early years: Results from Tayari Kenya

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Getting Children Ready for School

Introduction to Tayari

Pilot program at medium scale (2000+ centers) from 2016-19

Implemented by **local education officers in 4 counties**

RCT research design

Tayari longitudinal study with 4 datapoints for **Treatment 2**

4 learning areas – language, **numeracy**, life skills & social

Awareness of gender depictions and classroom discussion



Tayari Scope 2016-2019



	2016	2017 cohort	2017	2018 cohort	2018	2019
2016	644					
2017		588	1232			
2018				922	2154	
2019						2154



	2016	2017 cohort	2017	2018 cohort	2018	2019
2016	1353					
2017		1361	2714			
2018				1959	4673	
2019						4673



	2016	2017 cohort	2017	2018 cohort	2018	2019 cohort	2019 total
2016	36,729						
2017		33,027	69,756				
2018				58,346	128,102		
2019						21,029	146,921

Tayari Numeracy Teachers' Guides

Week 2 Day 4

Strand	Classification
Sub-Strand	Sorting and grouping
Specific learning outcomes:	By the end of the lesson, the learner should be able to sort and group objects according to colour and shape.
Suggested resources:	Objects of different colours around the classroom/school
Suggested activities:	Singing, sorting and grouping, daily routine
Link to PCE:	USD - Gathering learning objects from the environment
Core competences:	Effective communication - telling order of events
Values:	Responsibility as learners guide each other as they sort and group



Introduction

Daily routine

- Sing a number song.
- Let some learners tell what they did before coming to school in the morning (e.g. wake up, brush teeth, eat breakfast).
- Guide learners to tell the order of events from first to last.

Main Activity

Sorting and grouping

Whole class

- Tell the class that today you will look for and gather objects of three different colours, and shape from environment.
- Sort the objects by colour and shape.
- Explain to the learners that you have grouped objects of the same colour and shape together.
- Ask:
 - ◊ Why have you grouped these objects together?
- Have a few learners sort objects by colour and shape.

Small group

- Provide learners with objects of three different colours and shapes.
- Have each small group of learners walk around and gather objects of three different colours.
- Guide learners to group objects of the same colour together.

Learner's activity

- Guide them to circle all the green rectangles in their workbooks.
- Guide learners to circle the activity that comes first.

Conclusion

- Have a few learners show how they sort objects by colour and shape.

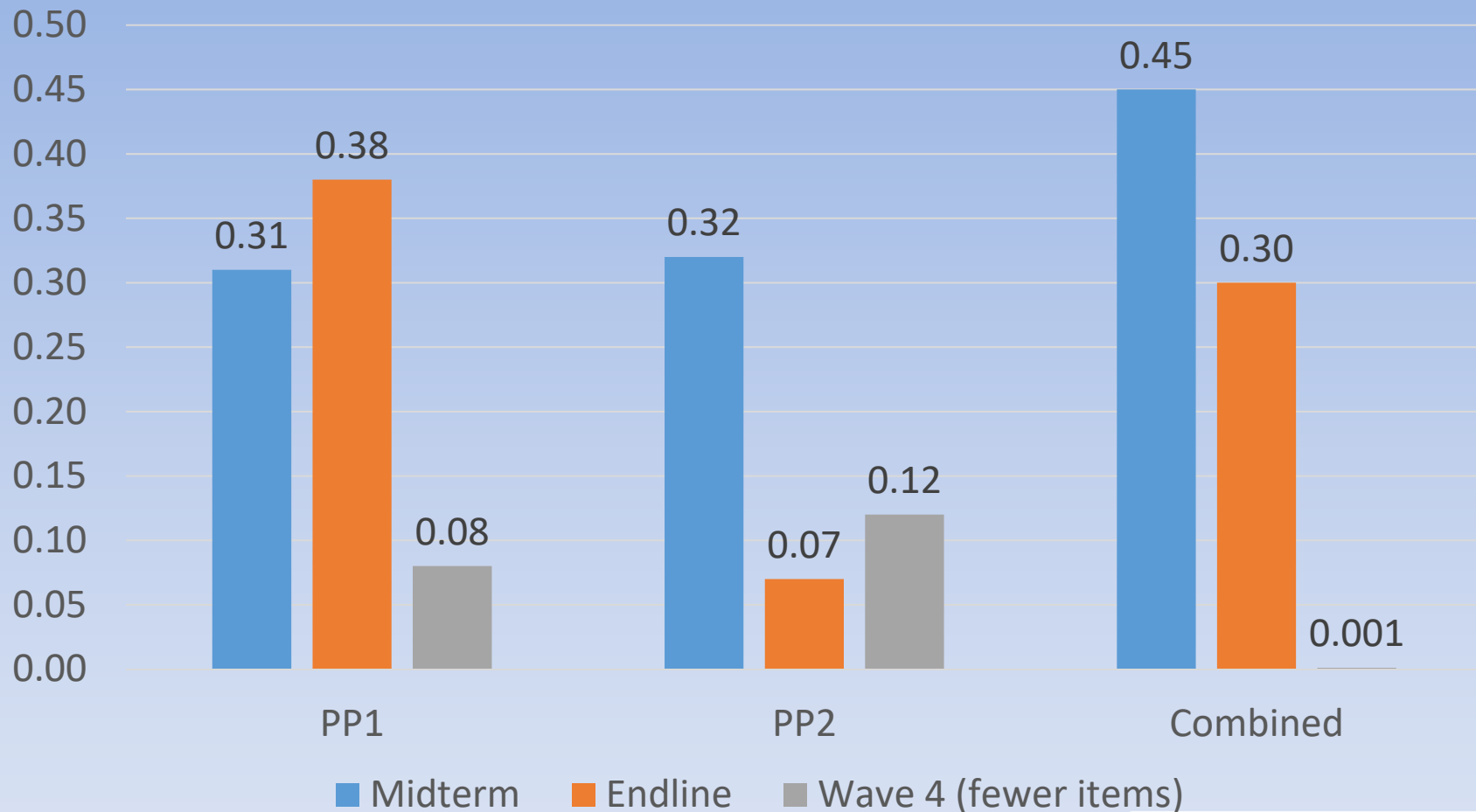
Gender and Math in the Preschool Years

- In general, lack of evidence of **major differences in performance by gender** in preschool
 - Study in Germany found that there was no difference between boys and girls in average math performance (Lonnemann, Linkersdorfer, Hasselhorn, & Lindberg, 2013)
 - Above average performance, boys were overrepresented
 - Below average performance, girls were overrepresented
- Lack of evidence from preschool in LMICs
- Evidence of **stereotypical attitudes and beliefs** developing at very young age
 - 5 year-old children in Chile believed that math was easier for boys, and language was easier for girls (del Rio & Strasser, 2012)
- Evidence of parents using more **number-related talk** with young boys versus young girls in United States (Change, Sandhofer, & Brown, 2011)

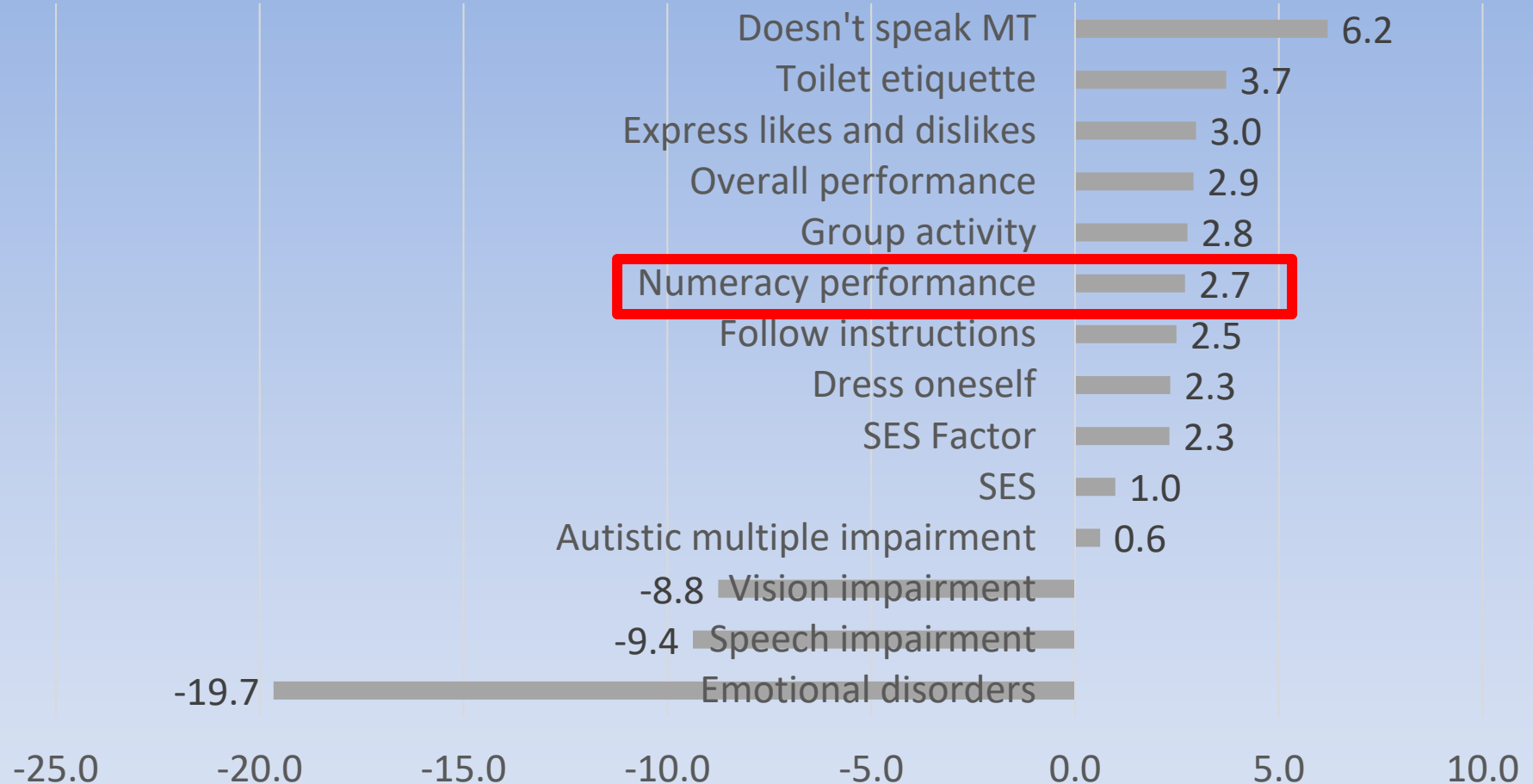
Tayari Data Collection



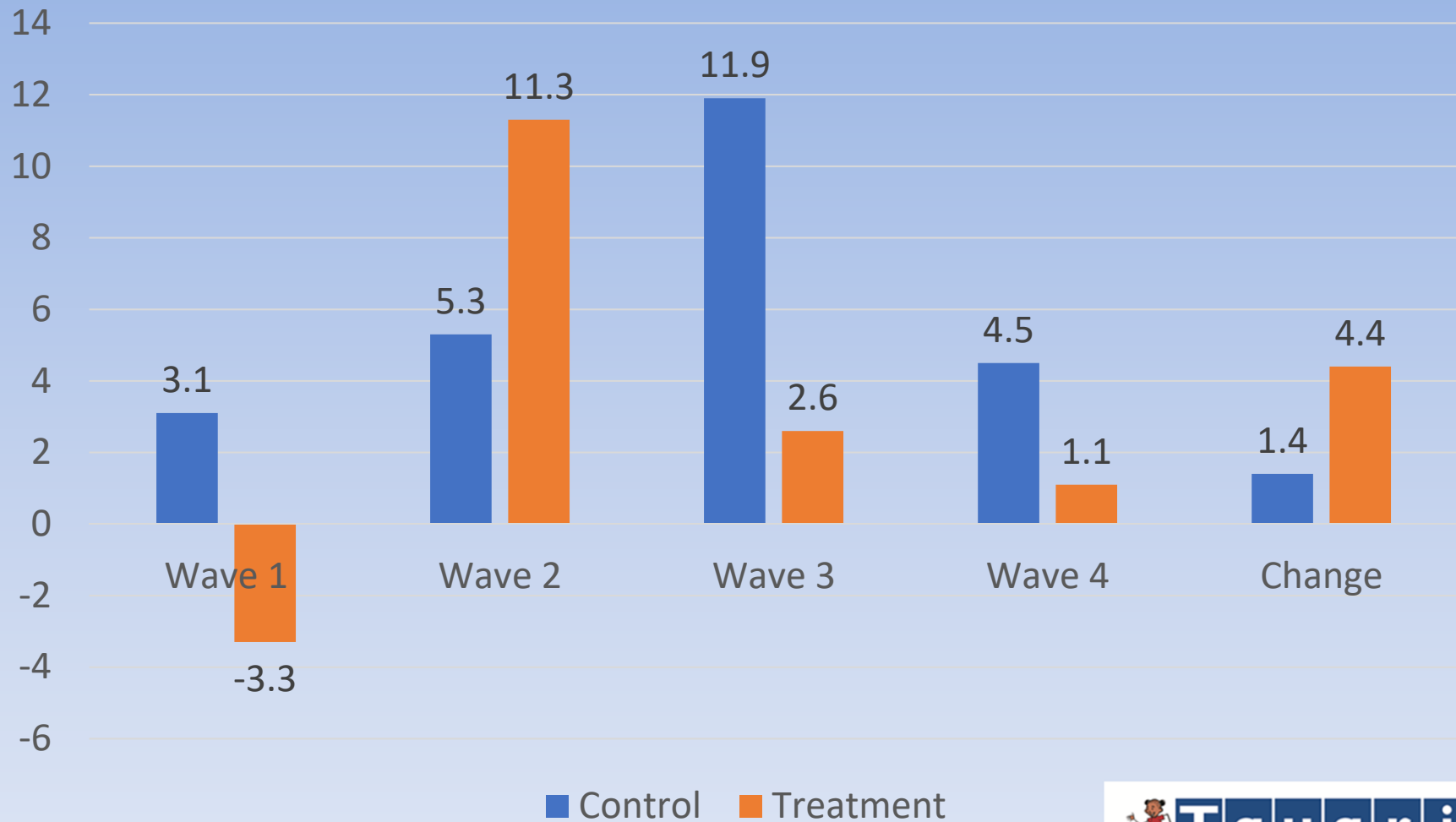
Gains in Tayari Longitudinal Index (Effect Sizes in SD)



Significant Predictors of Wave 3 School Readiness

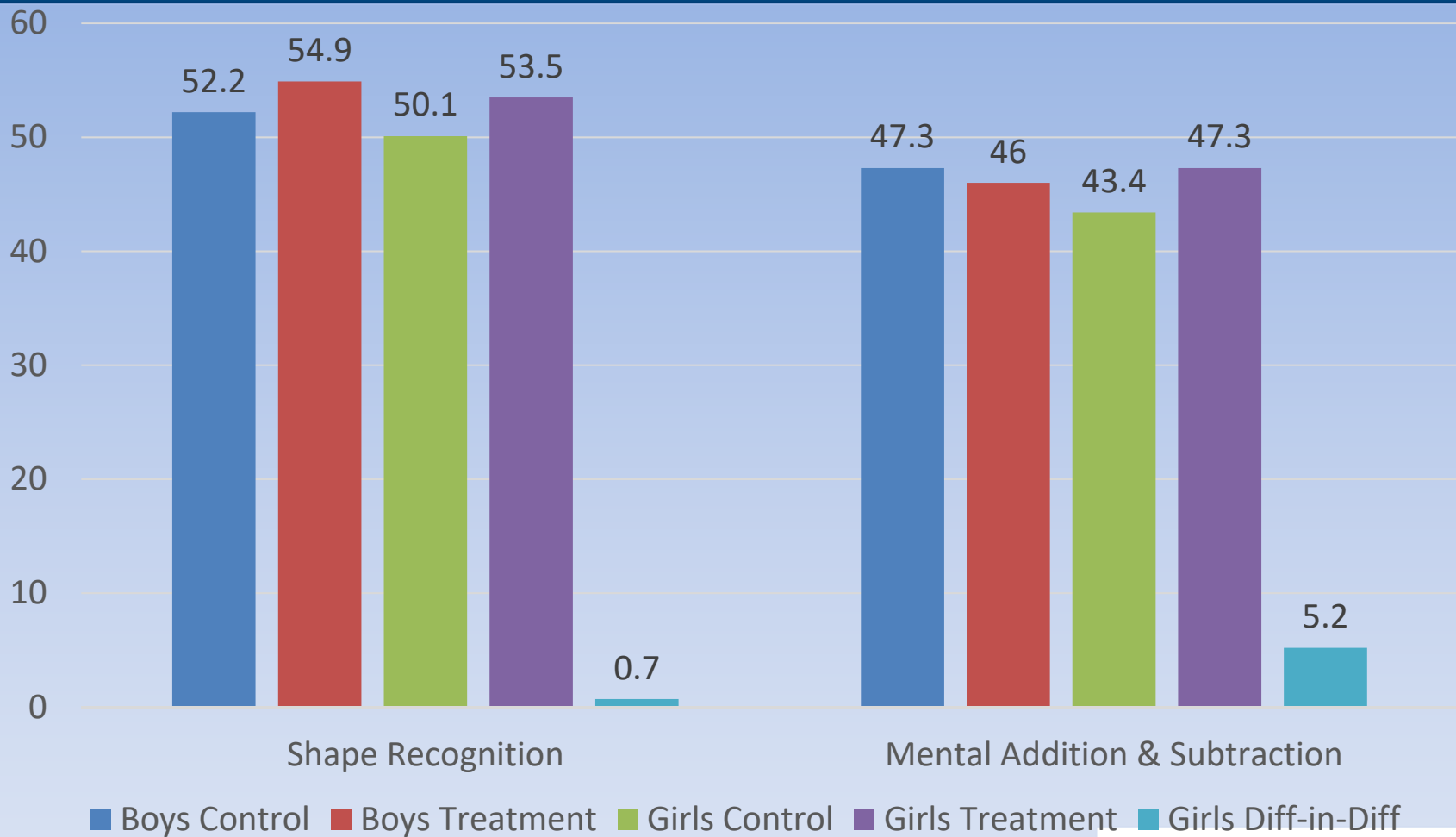


% Teachers See Girls' Numeracy Performance as Strong or Very Strong, Controlling for Baseline

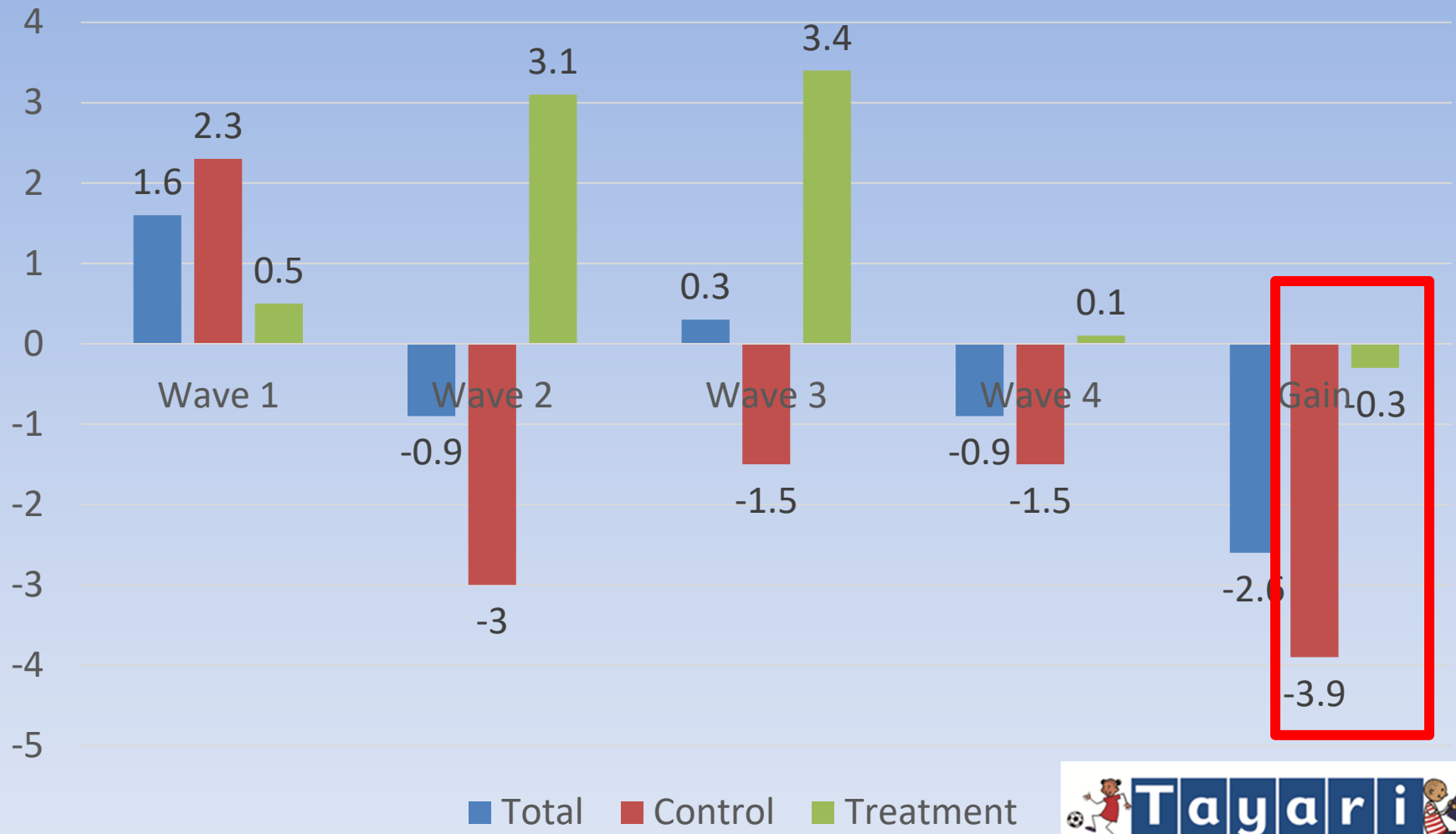


Tayari Wave 4 Numeracy Gain Scores

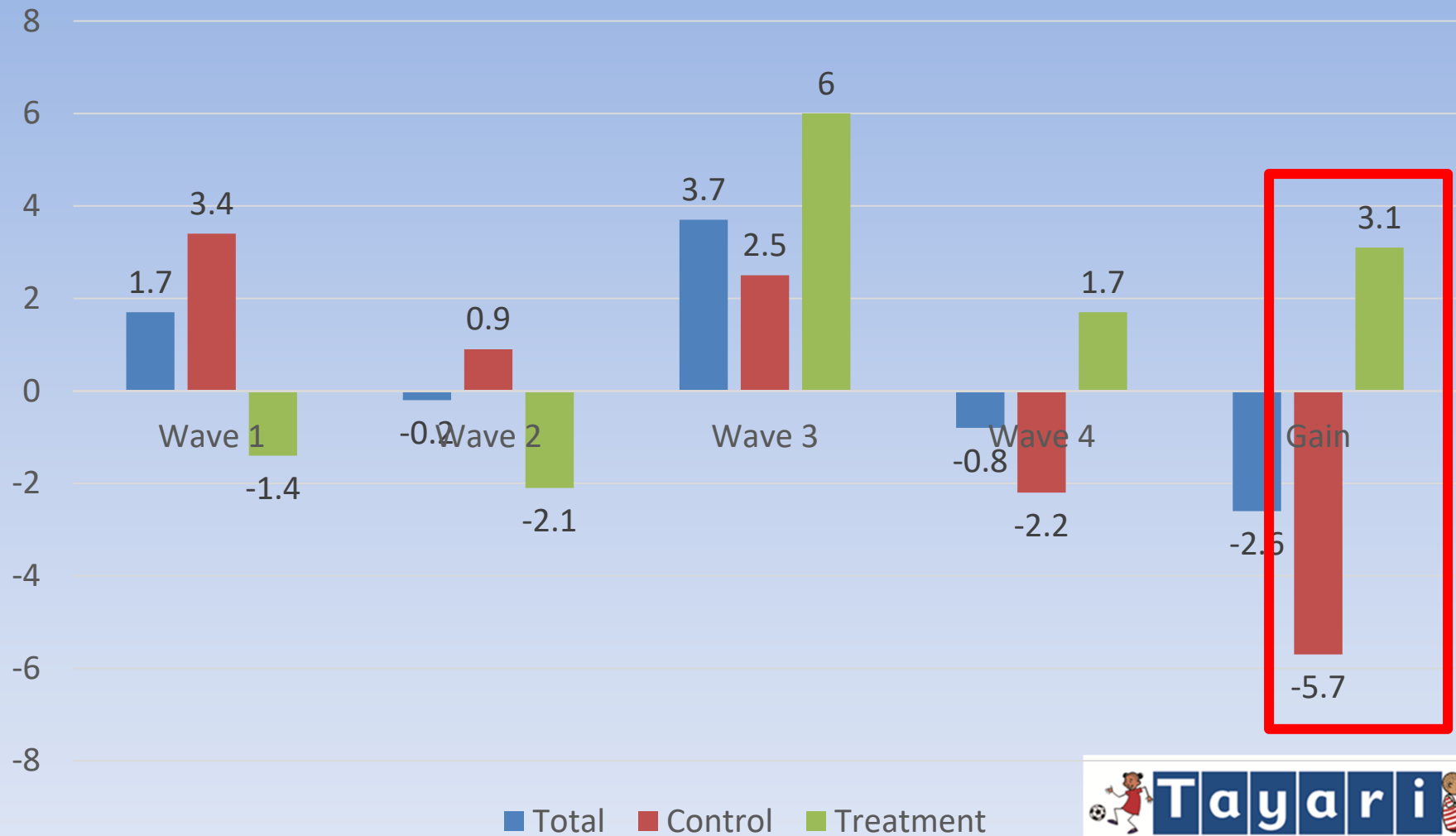
Diff-in-Diff



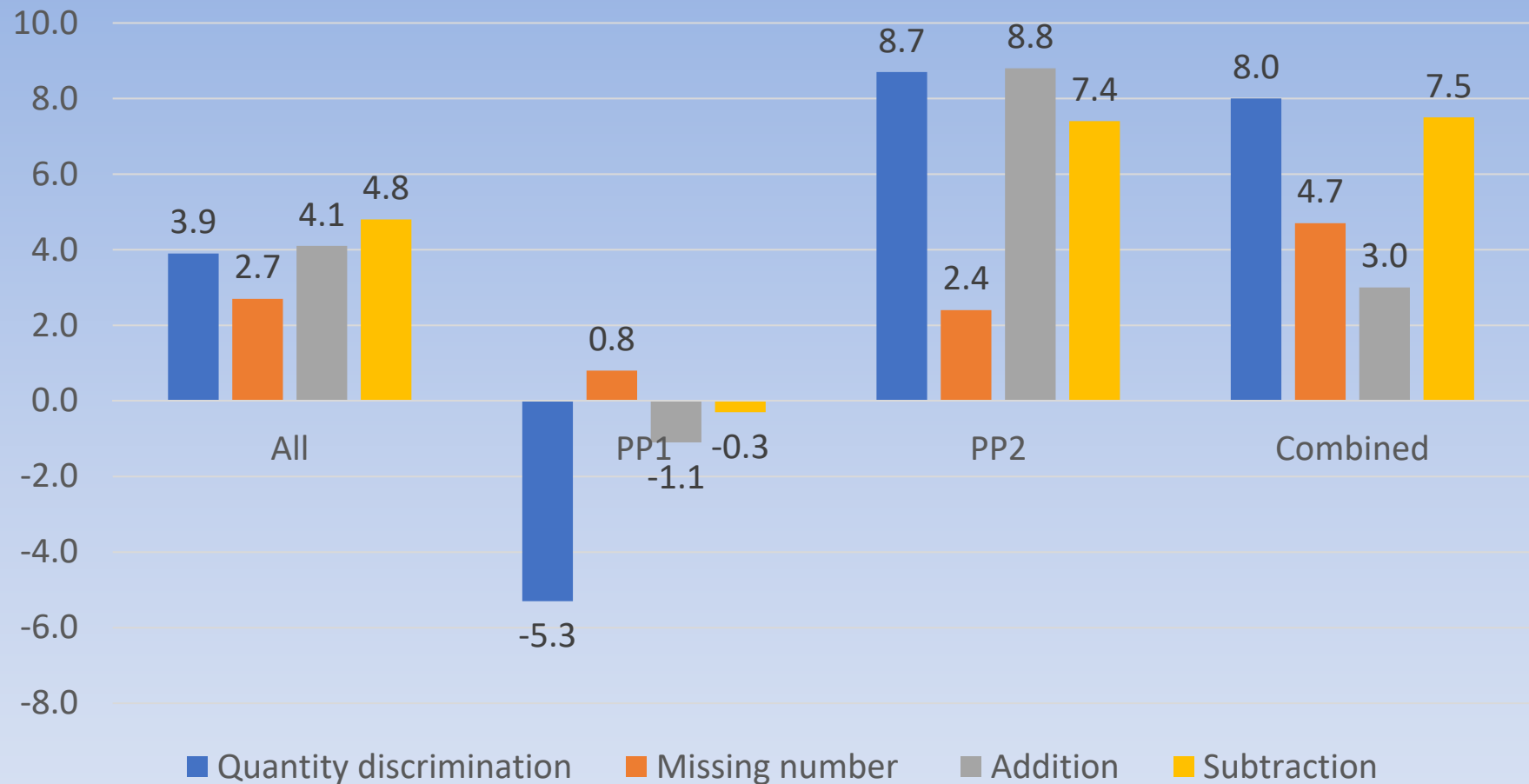
Gender Gaps in Shape Recognition by Wave



Gender Gaps in Mental Addition and Subtraction by Wave



Girls Differences-in-Differences Endline EGMA Scores



Key Findings

1. Longitudinal research shows **few differences by gender**
2. Modest evidence of **reduced gender gaps for school readiness** indicators in Tayari
3. Modest evidence of **positive girl effect over treatment** for EGMA
4. Modest **impacts on teacher perceptions of numeracy outcomes** for girls

Next Steps

1. Evidence on **attitudes and beliefs in the preschool years** from LMICs
 - Teachers, parents, and children
2. Research on **classroom practices during math** as related to gender
 - e.g., Who teachers call on more, how questions may or may not differ according to gender
3. More **longitudinal research** is needed on where the gap between girls and boys regarding gender first appears and how it progresses



Thank you

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