Childhood Factors Underlying the Gender Gap in STEM Career Attainment

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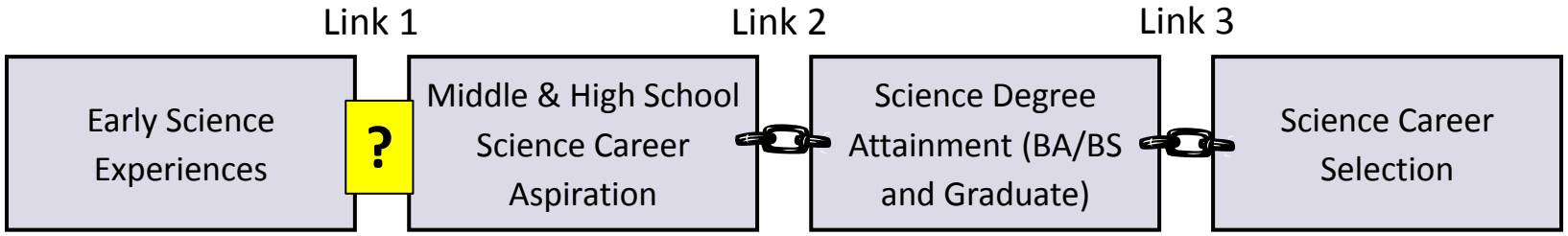
Massachusetts Linking Experiences and Pathways (M-LEAP) Research Study

Motivation



Research Questions

1. What science-related beliefs, experiences, and aspirations (SBEAs) do children have?
2. How are SBEAs related to each other, and are there gender-based differences?
3. How do SBEAs change over time? How are these early SBEAs associated with later achievement-related choices? How do these relationships differ by gender?

Methods and Participants

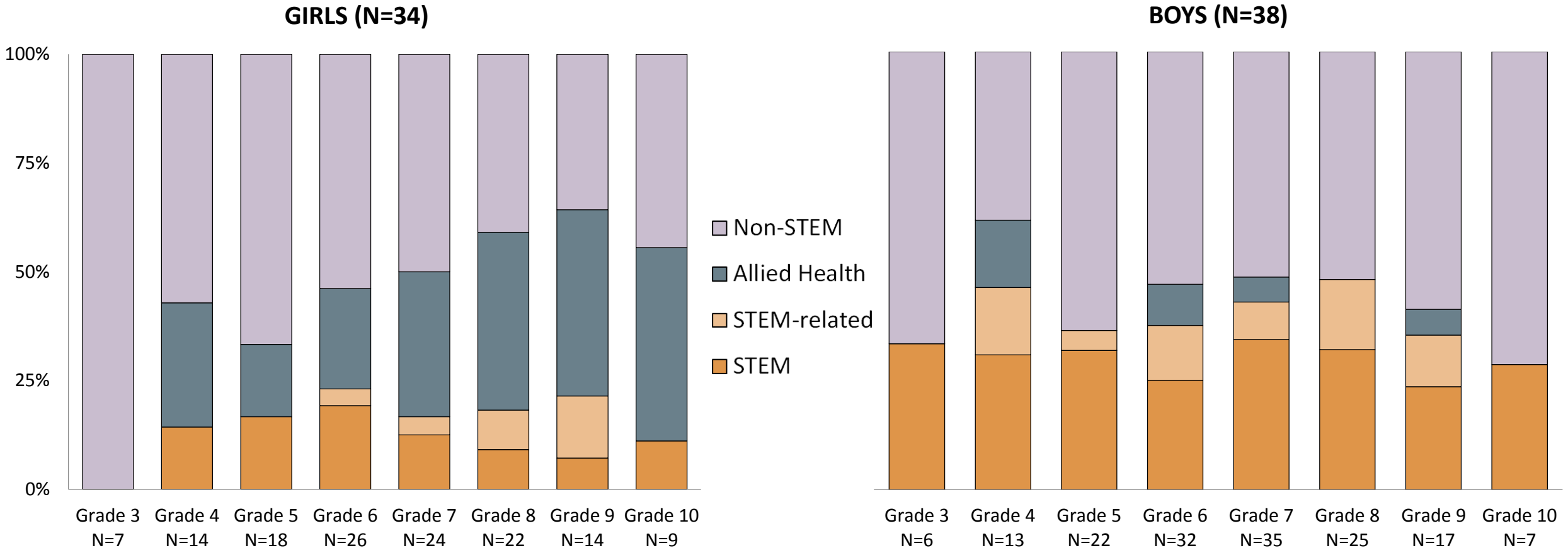
M-LEAP : *"What?"*

- Mostly quantitative
- N=1,300+ (four cohorts)
  - Grades 3-6 → Grades 5-8
- 8 schools across Massachusetts, USA
- Surveys
  - Students, parents, teachers
- Brief interviews with a subset of 100 students/year
- Interviews with science specialists

M-LEAP 2 : *"Why?"*

- More qualitative
- N=72
  - Grades 6-9 → Grades 8-11
- Recruited from M-LEAP1 sample
- Surveys continue
  - Students, parents
- In-depth, in-person interviews
  - Students, parents, siblings
- Interviews with 'admired' teachers

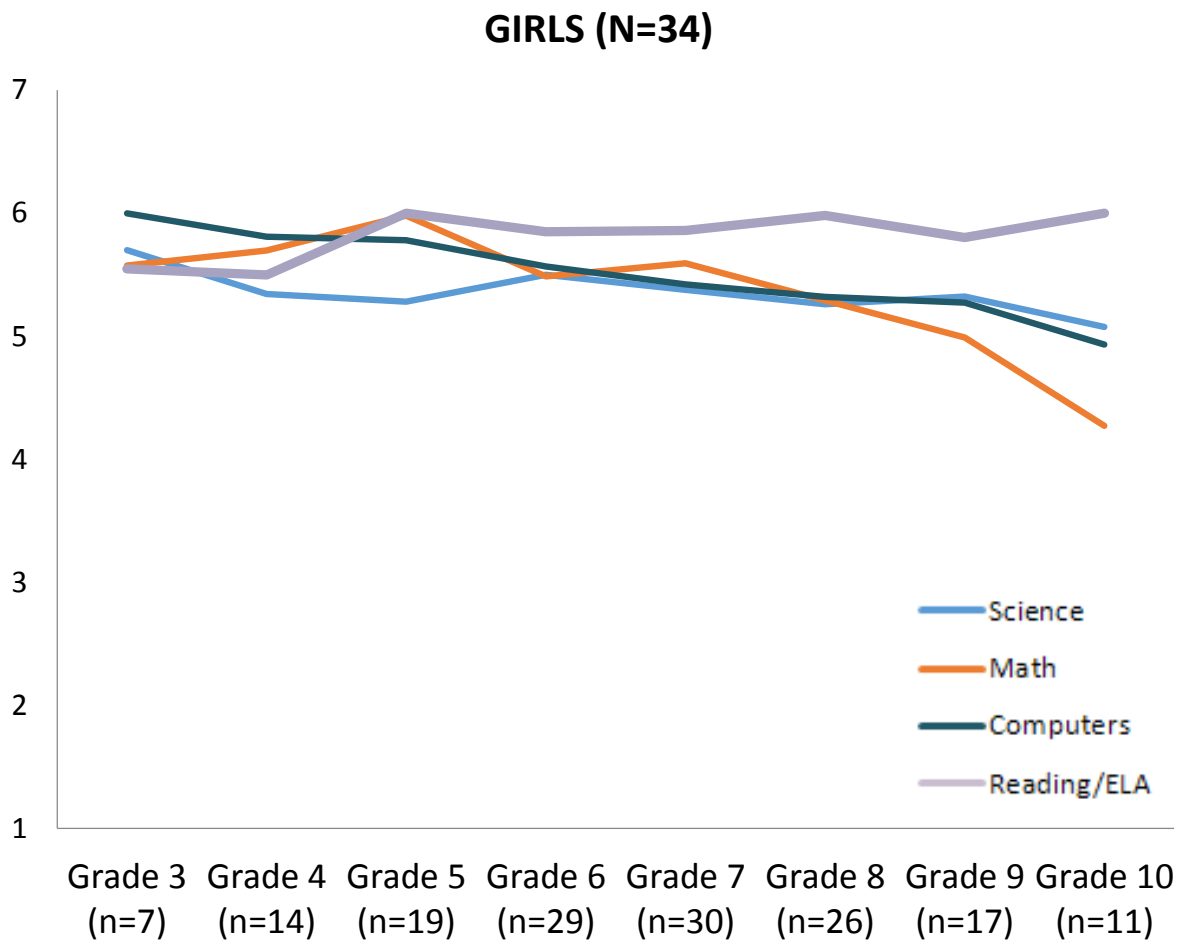
Key outcome: Student Career Aspirations

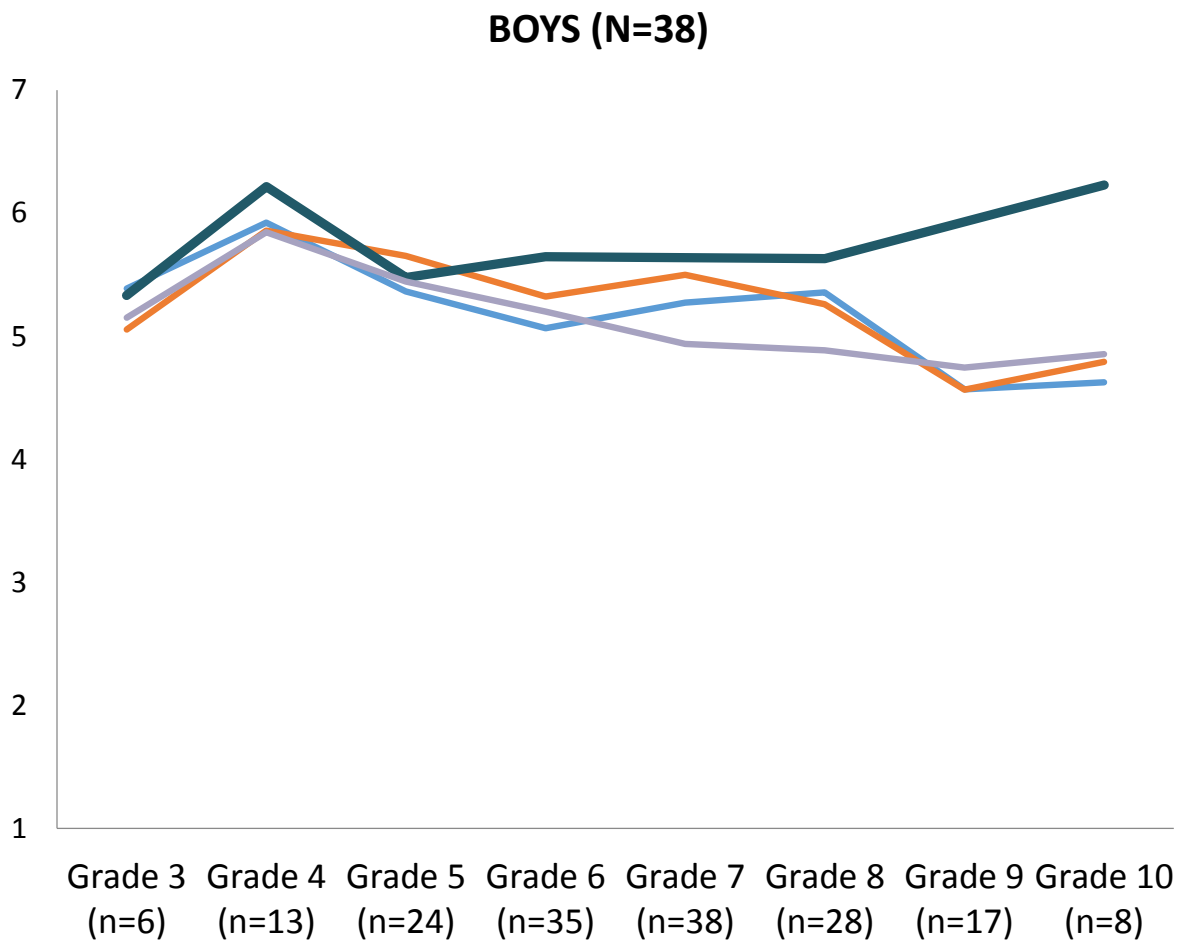


"Why this job?"

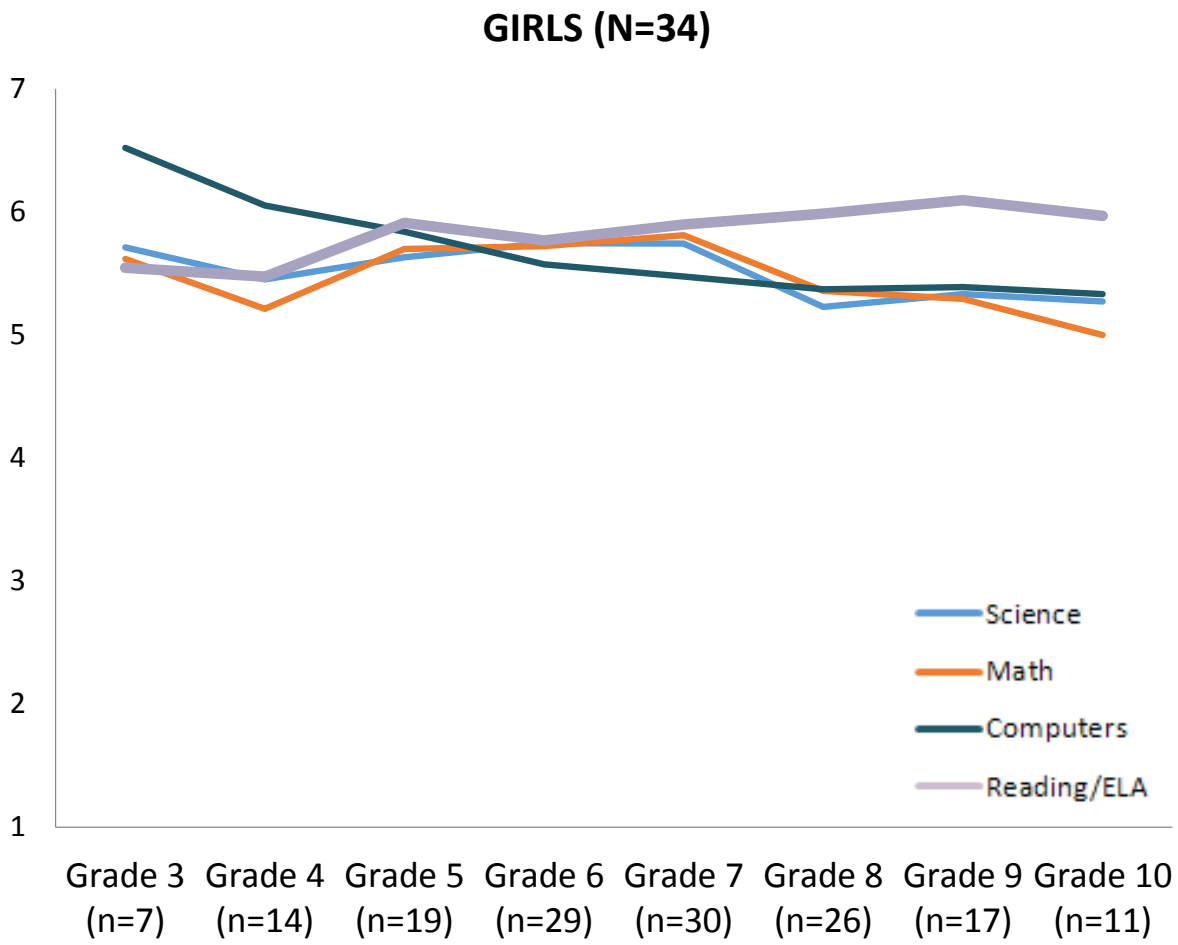
Non-STEM	Allied Health	STEM
• Subjective Task Value	• Subjective Task Value • "Helping People"	• Subjective Task Value • **Self Efficacy**

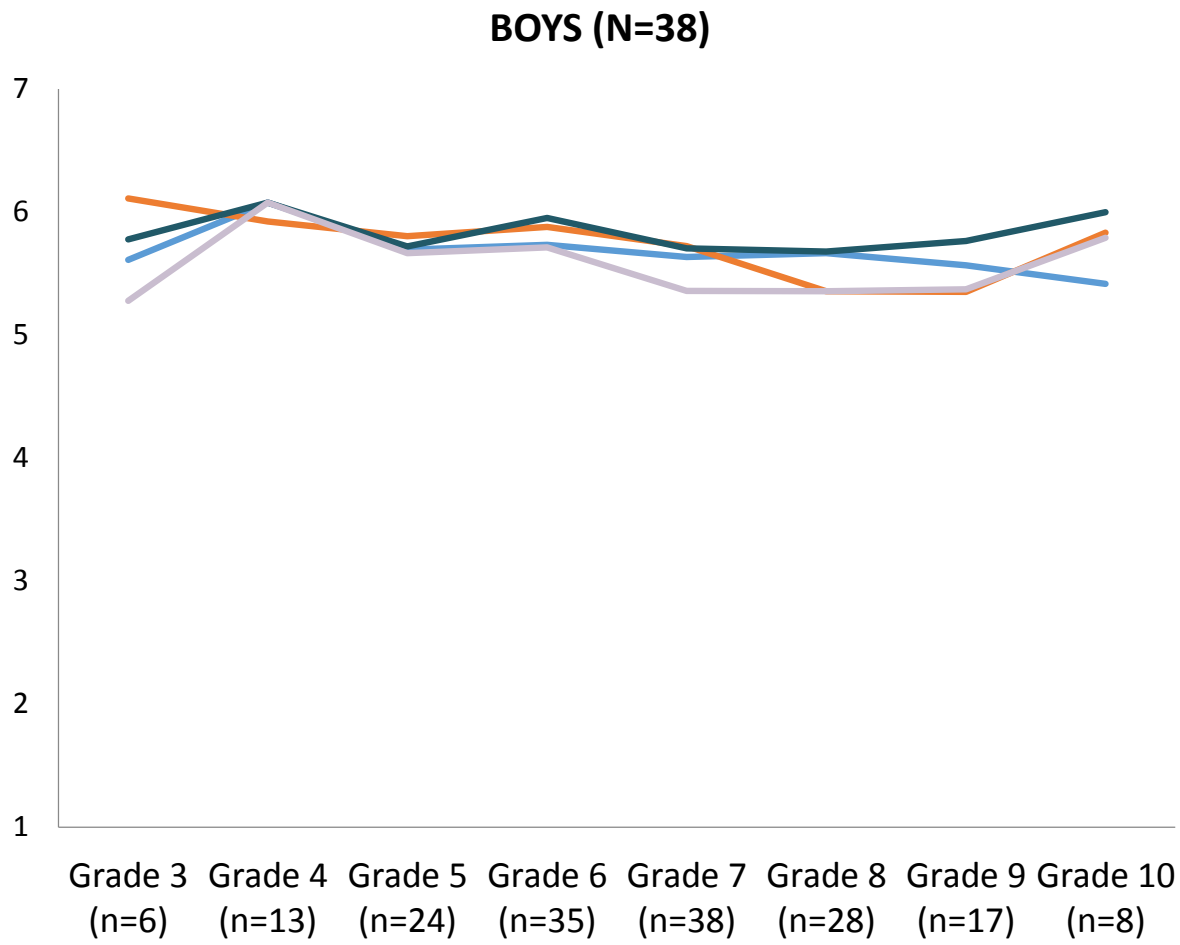
Subjective Task Value: All Subjects



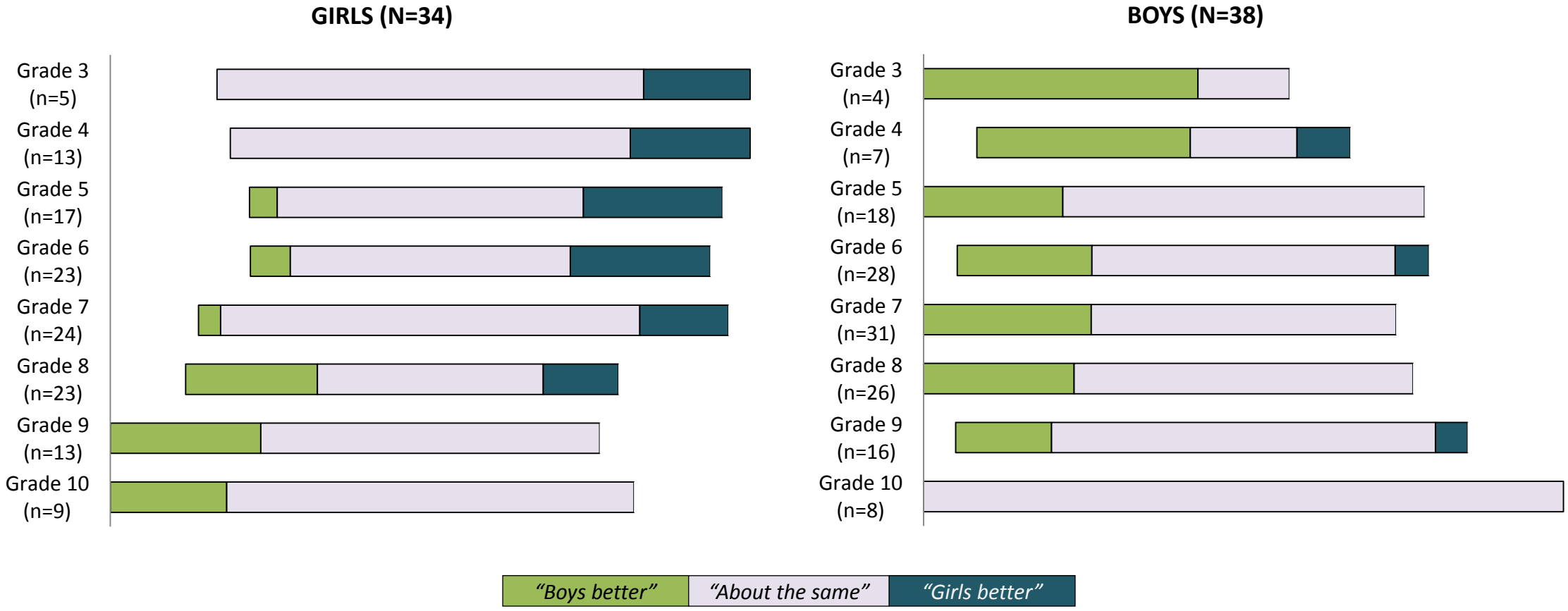


Self Efficacy: All Subjects

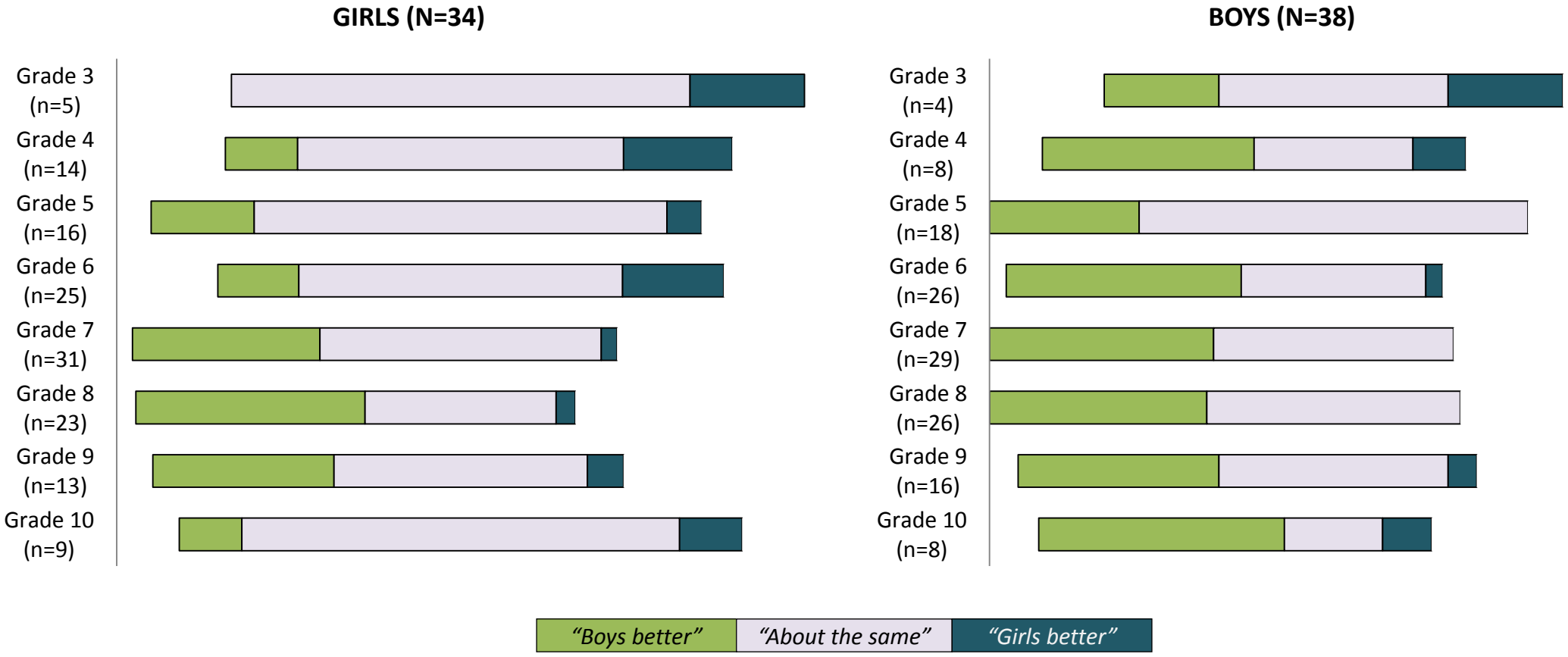




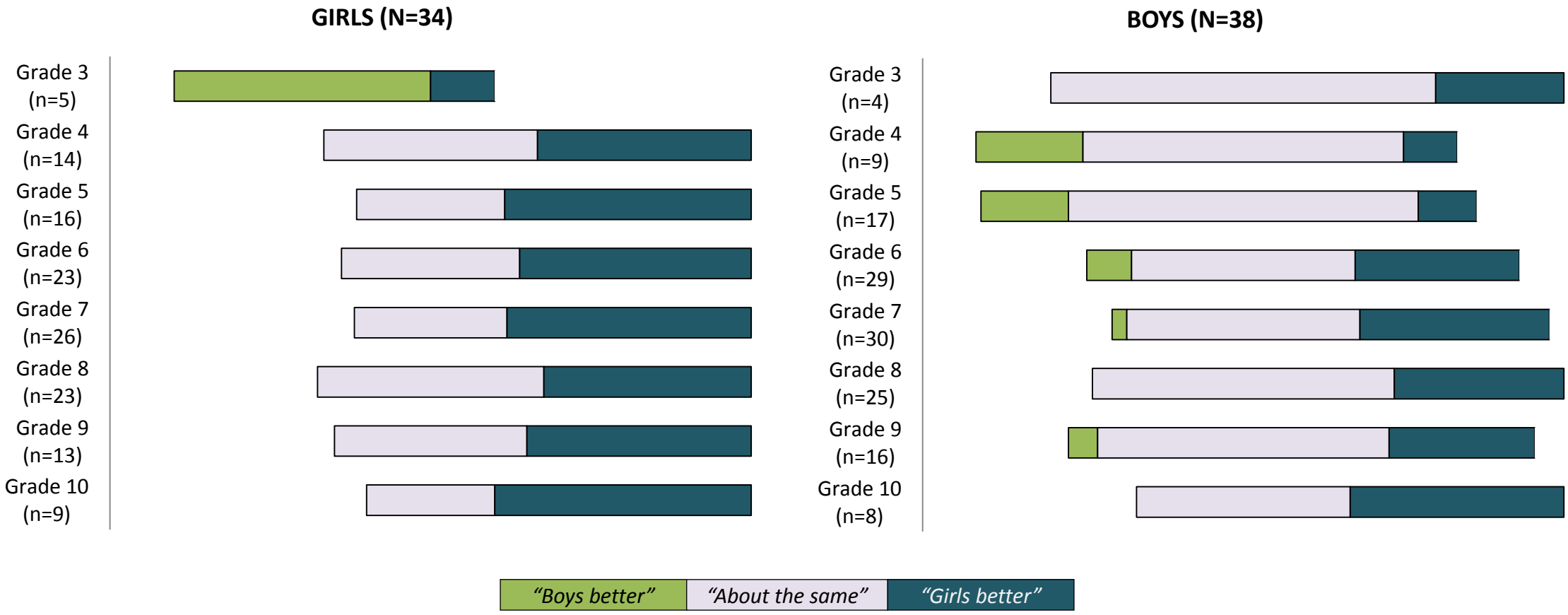
Gender Stereotypes: Science



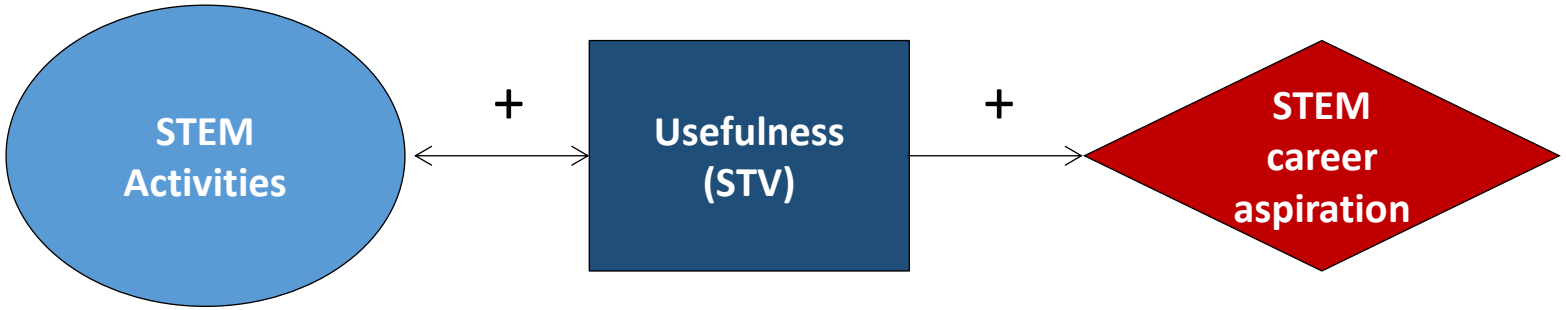
Gender Stereotypes: Computers



Gender Stereotypes: Reading/English Language Arts



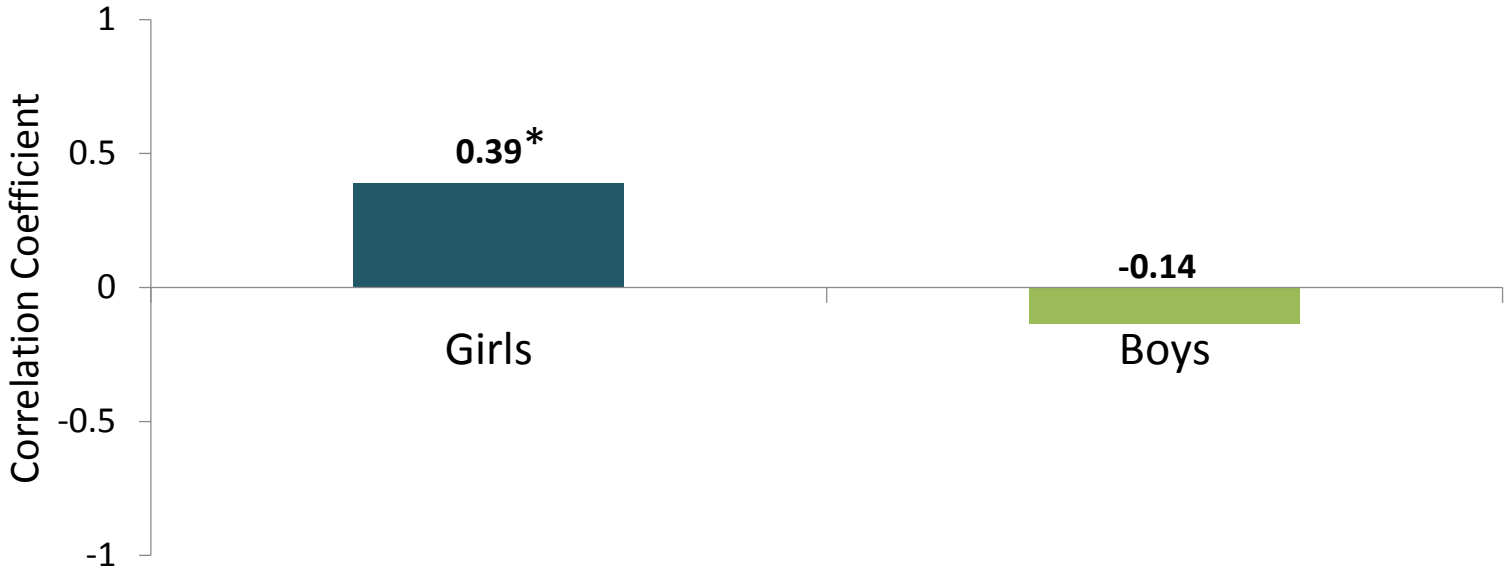
Out of School Activities



- "Independent" (as opposed to "Organized") STEM activities were key
- Similar rate of participation for boys and girls
  - Girls: Science, Biology, Environment
  - Boys: Technology
- Activities with parents (or other adults) were rare but powerful

Parent influence

Girls were more likely to name science as a favorite subject if they had a **parent with a STEM job** (*r= .39, p<.05*).



Meaningful STEM Mentors

Very few STEM “mentors” (n=6)

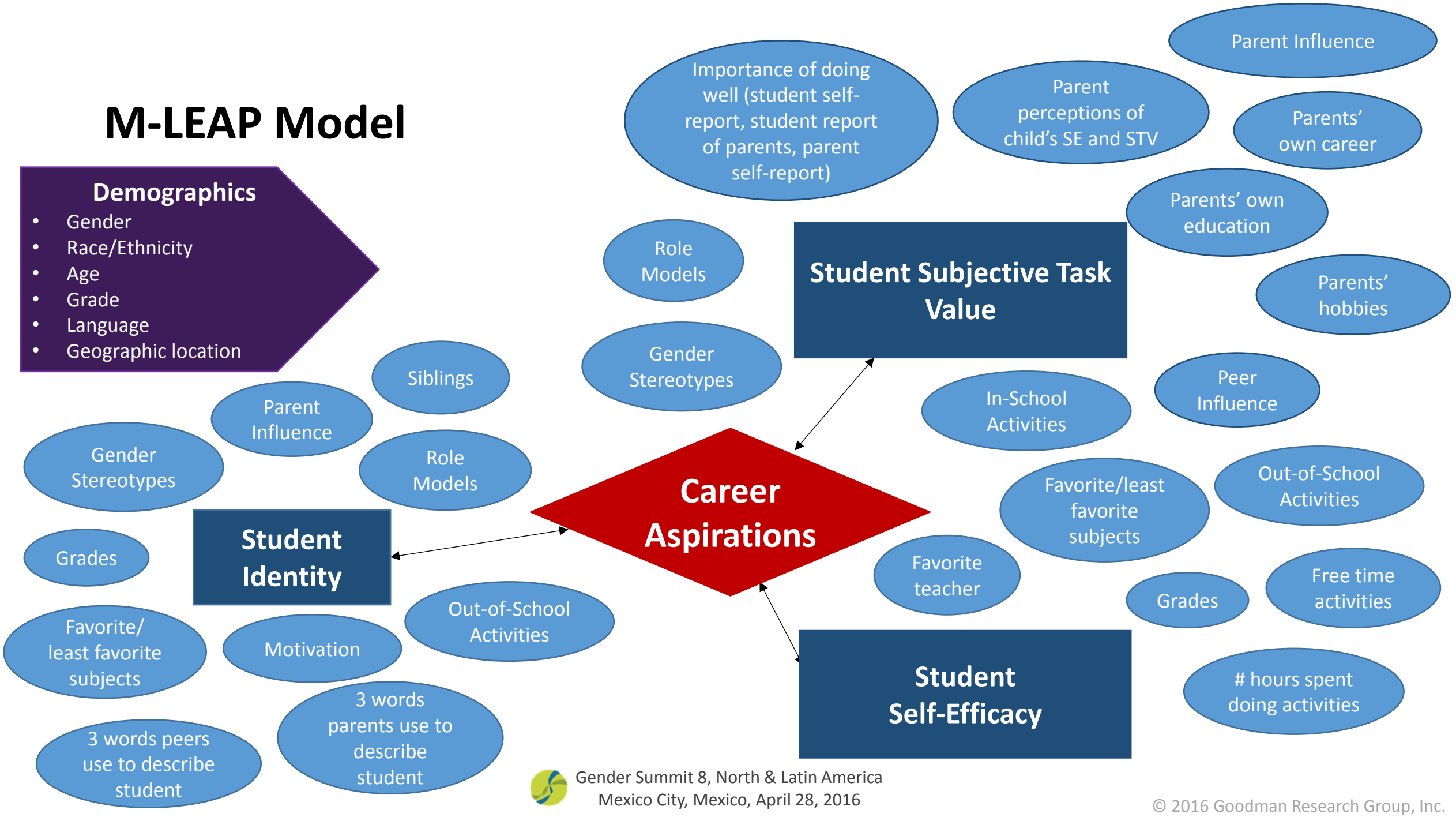
Girls (n=2)

- Discussing medicine, homework
- *“[A family friend in the neighborhood] helps me with math, so I’ve been working a lot with her. My mom knew she was really good at math and she had said she would be willing to meet with me…”*

Boys (n=4)

- All engineering projects
- *“A few of my dad’s friends are engineers and I’m also interested in the fields they are working in, so [I] talk with them about it.”*

M-LEAP Model



Recommendations

Gender stereotypes

- Increase awareness of the importance of gender-neutral attitudes about boys' and girls' interests and abilities in STEM subjects and skills

Out of School activities

- Encourage independent STEM activities
- Adults (parents/mentors) should get involved in STEM activities with students to help them gain and maintain interest

STEM Careers

- Career education needed at all ages (elementary through high school)
- Partnerships between colleges, industry, and local schools helps expose girls to women who are pursuing higher education or careers

Contributions

- Longitudinal, mixed-methods, prospective research
- Research participants started as young as 8 years old
- Broad focus on STEM and "21st century skills"
- Family and other systems of influence (e.g. school, informal education)

Thank You!

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