



NEBRASKA CENTER FOR RESEARCH ON
CHILDREN, YOUTH, FAMILIES & SCHOOLS

Latina/o Parents' Role in Youth's STEM Identity, Self-Efficacy, and Competence

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Background

- Low percentage of adults earning degrees and pursuing careers in science, technology, engineering, and mathematics (STEM) (NAE, 2011; NSB 2012; NSF, 2015)
 - Increase in the number of available STEM careers, many going unfilled (My College Options & STEMconnector, 2012)
- Ethnic-racial and gender disparities in STEM careers endangering sustainability of technology-based U.S. society (NSF, 2010)

Latino Population

- A large and growing population in U.S. schools
 - 25% of U.S. students (Fry & López, 2012)
- Positive indicators of educational and occupational wellbeing have not kept pace with population increase
 - Low representation in courses that prepare for postsecondary academic success (Riegle-Crumb, 2006)
 - Receive fewer degrees in STEM (National Science Board, 2008)

Expectancy-Value Theory of Academic Motivation

- Early beliefs and experiences shape later educational and occupational trajectories (Heckman, 2006)
- Academic ability beliefs and subjective task values precursors of academic achievement and career trajectories (Eccles & Wigfield, 2002)
 - Ability beliefs – perceptions of competence in academic domain
 - Subjective task values – utility value, such as usefulness, importance, interest

Role of Parents

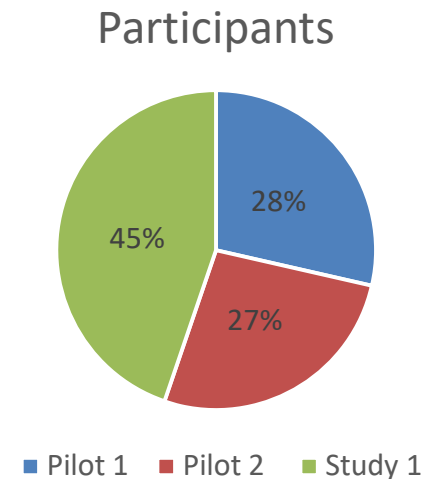
- Children's achievement-related beliefs do not develop in isolation
 - Children's perceptions of academic competence appear to be strongly influenced by parents' attitudes, stereotypes, and beliefs about child ability (Frome & Eccles, 1998; Jacobs, 1991; Simpkins et al., 2012)

Research Questions

1. What is the role of parents' self-efficacy and engineering-related beliefs in young children's engineering-related ability and subjective value beliefs among Latino families? (Arellano & Padilla, 1996; Eccles et al., 1998)
2. Does parental warmth strengthen associations? (Darling & Steinberg 1993; Lowe & Dotterer, 2013; Wigfield et al., 2015)
3. What is the role of youth gender? (Alegria & Branch, 2015)

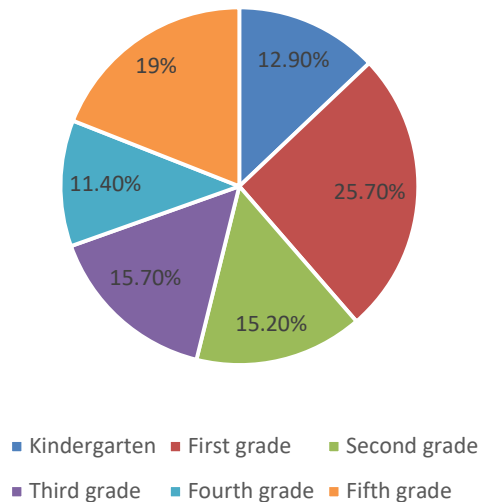
Equity in Engineering Study

- Original study
 - Two pilot studies and one longitudinal study (Study 1-2; Waves 1, 2, and 3) conducted in the Southwestern U.S.
 - Investigates elementary school children's knowledge of and motivation to engage in engineering, as well as ethnic, developmental, and gender differences in these constructs
- Current Study
 - 210 Latina/o K-5 students (Pilots & Study 1)
 $M_{age} = 7.92$, $SD_{age} = 1.93$; 54% female
 - Parents (85% mothers)
 - Inclusion criteria: parents identified the student or self-identified as Latina/o

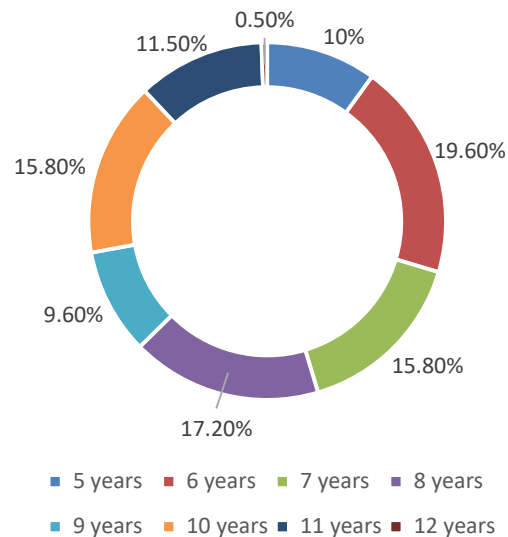


Equity in Engineering Study: Demographics

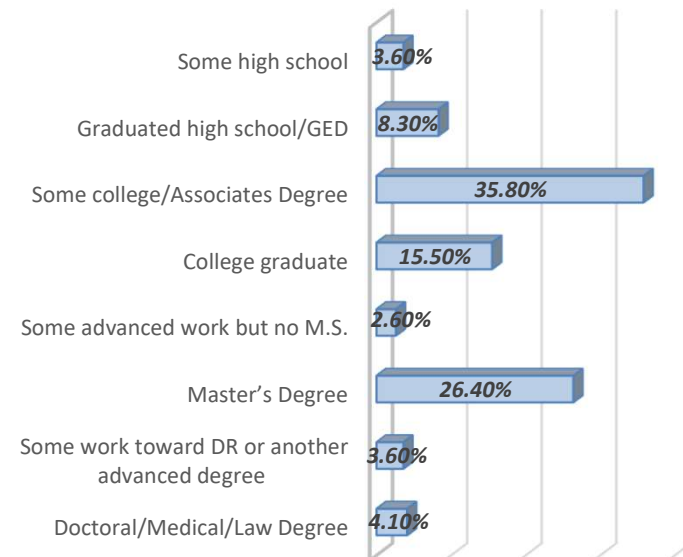
Child Grade distribution



Child Age distribution



Family's highest educational attainment



Parent preferred language: 81% English; 18% Spanish; 0.5% Either; 0.5% Other ($n = 185$).

Child Report Measures: Dependent Variables

Construct	Measure	# Items	Example Items	Response Scale
Ability Beliefs	Engineering-Related Competency	8	<ul style="list-style-type: none"> How good are you at asking why things work? 	0 (<i>Not at all good</i>) to 3 (<i>Very good</i>)
Subjective Task Values	Engineering-Related Interest	8	<ul style="list-style-type: none"> How much do you like taking things apart and putting them back together? 	0 (<i>Not at all</i>) to 3 (<i>A lot</i>)
	Self-Importance of Engineering-Related Activities/Skills	8	<ul style="list-style-type: none"> How important is it for you to be good at trying out your ideas? 	0 (<i>Not at all important</i>) to 3 (<i>Very important</i>)
	Engineering-Related Career Interests	8	<ul style="list-style-type: none"> When you grow up, how much would you like a job where you ask why things work? 	0 (<i>Not at all</i>) to 3 (<i>A lot</i>)

Parent Report Measures: Independent Variables

Construct	Measure	Items	Example Items	Response Scale
Self-efficacy	Parental Self-Efficacy related to Engineering-Related Activities and Skills	8	How confident do you feel in your ability to help your child in each of the following activities/skills? <ul style="list-style-type: none"> Taking things apart and putting them back together? 	0 (<i>Not at all confident</i>) to 3 (<i>Very confident</i>)
Ability Beliefs	Child Competency in Engineering-Related Activities and Skills	8	How good is your child at: <ul style="list-style-type: none"> Coming up with plans to make things work? 	0 (<i>Not at all good</i>) to 3 (<i>Very good</i>)
Subjective Task Value	Parental Importance of Engineering-Related Activities and Skills	8	How important is it to you that your child does well at: <ul style="list-style-type: none"> Asking why things work? 	0 (<i>Not at all important</i>) to 3 (<i>Very important</i>)

Parent Report Measures: Moderators

Construct	Measure	Items	Example Items	Response Scale
Parental Warmth	Parental Reports of Parental Behavior: An Inventory (Schaefer, 1965)	8	<ul style="list-style-type: none"> You spoke to your child in a warm and friendly voice You understood your child's problems and worries 	0 (<i>Almost never</i>) to 3 (<i>Almost always</i>)
Youth Gender		1	<ul style="list-style-type: none"> Gender (from consent form) 	0 = Girls; 1 = Boys

Analytic Strategy

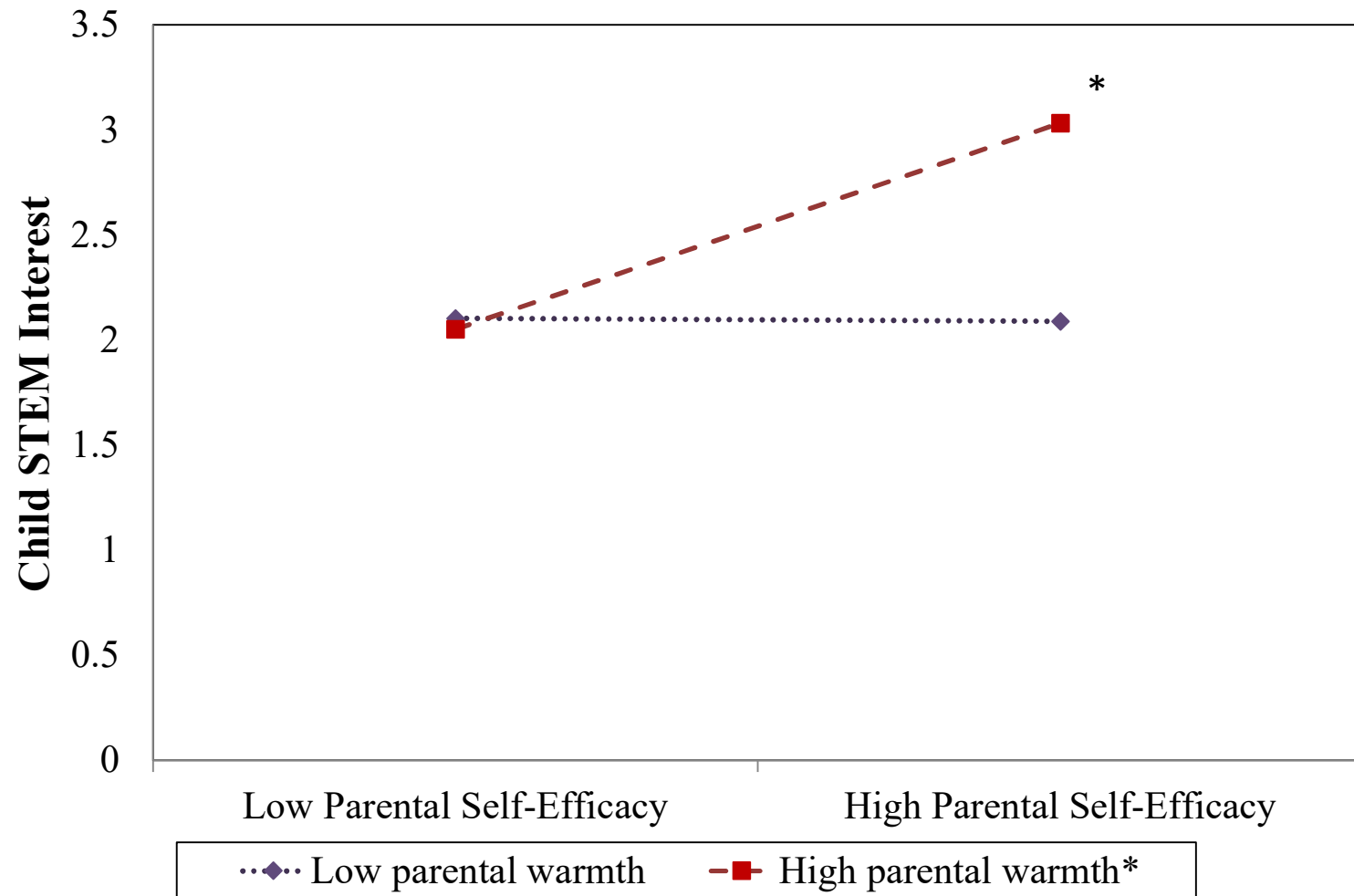
- Multilevel multiple regression using SAS®9.4
 - Children clustered within parents
 - Higher-level (Level-2) parent variables grand-mean centered
 - Three regression models for each outcome
 1. No moderators
 2. Warmth as moderator
 3. Youth gender as moderator
 - Covariates
 - Family educational attainment
 - Parent and youth gender
 - Parent's expectations for child's educational attainment

RQ1 Results:

Role of Parents' Self-Efficacy & Beliefs

- ↑ family educational attainment related to ↑ child reported engineering activity/skill competency
- ↑ parent self-efficacy related to ↓ child reported engineering activity/skill importance

RQ2 Results: Moderation of Parental Warmth



RQ3 Results:

Moderation of Youth Gender

- For boys, but not girls
 - ↑ parent-rated importance of engineering-related activities ↓ boys' interest in engineering-related activities
 - ↑ parent expectations for child's educational attainment related to ↑ boys' engineering-related career interest

Discussion

- Family educational attainment related to children's perceived engineering-related competence
 - Suggesting an advantage of these family contexts
- Overall, high parent self-efficacy related to lower children's perceived engineering-related importance

Discussion

- Context of high parental warmth important
 - When parents have high self-efficacy and are warm, they may also engage in engineering-related activities with their kids that promote ability and interest
- Children's gender matters
 - Parental importance relates to boys' lower current interest in engineering-related activities
 - Parents' educational expectations relate to boys' higher career interest

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