

Measuring Lay Theories of Parenting and Child Development

Emily Hembacher¹ & Michael C. Frank¹

¹ Stanford University

Author Note

Add complete departmental affiliations for each author here. Each new line herein must be indented, like this line. Enter author note here.

Correspondence concerning this article should be addressed to Michael C. Frank, 450 Serra Mall, Stanford, CA 94301. E-mail: mcfrank@stanford.edu

Abstract

Enter abstract here. Each new line herein must be indented, like this line.

Keywords: keywords

Word count: X

Measuring Lay Theories of Parenting and Child Development

Survey Construction**Generation of items****Revised questionnaire norming**

Alpha for the whole scale was 0.90, alpha for the AA subscale was 0.82, alpha for the EL subscale was 0.83, and alpha for the RR subscale was 0.81.

Factor analysis**Survey Validation****External Validity Study 1: Demographic Factors**

Approaches to parenting are known to differ across cultures and groups. To better understand whether the parenting attitudes captured by our survey reflect group differences, we examined average scores on the PAQ subscales based on demographic factors. We administered the PAQ to 680 parents who were members of a local children's museum and subsequently asked them to provide information about their gender, level of education, age, ethnicity, and the number of children they have. Figure 4 displays the average PAQ scores for each demographic category.

To quantify any possible group differences, we fit separate Bayesian mixed-effects ordinal regression models for each subscale (AA, EL, RR) with the following structure, with likert ratings of agreement for each item (1-6) entered as dependent measures: `agreement rating ~ age + education + ethnicity + gender + number of children + (1 | subject) + (1 | item)` Groups with fewer than 20 cases were removed from plots and analyses to avoid overfitting. Although displayed as categorical for visual simplicity in Figure 4, parent age and education in years were entered as continuous variables in the regression models.

Table 1 displays the results of the regression analyses. We found that stronger agreement with AA attitudes was associated with identifying as Hispanic or Latino ($\beta = 0.72$, 95% CI = 0.34 - 1.11), White ($\beta = 0.31$, 95% CI = 0.12 - 0.49), or multiple ethnicities ($\beta = 0.50$, 95% CI = 0.18 - 0.82) compared to Asian (the comparison level). Having a greater number of children was associated with lower agreement with AA attitudes ($\beta = -0.14$, 95% CI = -0.24 - -0.03), as was identifying as Male ($\beta = -0.70$, 95% CI = -0.92 - -0.48). Parent education was not meaningfully associated with AA scores.

We found that stronger agreement with EL scores was associated with identifying as White ($\beta = 0.44$, 95% CI = 0.25 - 0.62) or multiple ethnicities ($\beta = 0.56$, 95% CI = 0.22 - 0.90), and having more children was associated with slightly lower agreement with EL scores ($\beta = -0.14$, 95% CI = -0.24 - -0.03). No other demographic variables were related to EL scores.

Finally, we found that stronger agreement with RR attitudes was associated with having a greater number of children ($\beta = 0.15$, 95% CI = 0.04 - 0.25), and identifying as White was associated with lower agreement with RR attitudes ($\beta = -0.20$, 95% CI = -0.38 - -0.01).

Study 2: Relation to parenting behaviors

Another way of assessing the ecological validity of the PAQ is to ask whether the parenting attitudes it assesses are related to actual parenting behaviors. For example, do parents who strongly agree with items on the Early Learning subscale read to their children more often? Do parents who strongly endorse items on the Rules and Respect subscale give more time-outs? To assess this, we asked a sample of 250 parents on Amazon's Mechanical Turk to complete the PAQ and then rate the frequency with which they engaged in a number of parenting behaviors, focusing on the prior month (Table 3). We elicited responses about 12 different behaviors, with four corresponding to each PAQ category. Parents chose between the following frequency options: "Multiple times per day", "Most days", "Once or

twice per week,” “Occasionally,” “Almost never,” “Never,” and “My child is too young for this.” Parents who did not have children under the age of 5 were excluded from analyses, as were any responses of “My child is too young for this.”

The distribution of frequencies that parents reported is displayed in Figure 5. To assess whether parenting behaviors are associated with parenting attitudes, we calculated participants’ average PAQ subscale scores and fit separate bayesian ordinal logistic mixed-effects regressions for the three categories of behaviors with the following structure: `behavior frequency ~ AA PAQ score + EL PAQ score + RR PAQ score + child age + (1 | subject) + (1 | item)` (Table 2). The relation between PAQ scores and behavior frequencies are presented in Figure 6.

We found that the frequency of AA behaviors was positively associated with AA attitudes ($\beta = 0.81$, 95% CI = 0.53 - 1.12), but not RR or EL attitudes or child age. Frequency of EL behaviors was positively associated with stronger agreement with both AA ($\beta = 0.37$, 95% CI = 0.02 - 0.71) and EL attitudes ($\beta = 0.52$, 95% CI = 0.18 - 0.88). The frequency of RR behaviors was positively associated with stronger RR attitudes ($\beta = 0.34$, 95% CI = 0.05 - 0.63), and to a lesser extent, child age ($\beta = 0.03$, 95% CI = 0.01 - 0.05).

Study 3: Uptake of new information about parenting and child development

Parents’ attitudes about parenting and child development may be an important consideration for crafting interventions on parenting behaviors or beliefs. There are frequent efforts to intervene on parenting practices, for example, public service announcements telling parents to read to their children; courses aimed at helping fathers engage with their children; messages aimed at encouraging parents and teachers to give children opportunities for free play. There is evidence that existing lay theories can interact in surprising ways with this type of messaging in other domains. Here we asked whether parents’ attitudes about parenting and child development would predict how they uptake new information about child development versus an unrelated topic.

We asked 250 adults on Amazon’s Mechanical Turk to fill out the PAQ and then read four popular press articles, two of which related to child development and two of which related to other science topics. The articles were edited for length, and the order in which the articles were presented was randomized. Next, participants answered six four-alternative forced-choice questions testing their memory and understanding of each article (24 total questions). We were specifically interested in whether participants who agreed more strongly with EL attitudes would better understand and remember the information in the child development articles, which we predicted may have been consistent with their existing views of development. Participants’ accuracy in relation to their average AA, EL and RR scores is displayed in Figure 7.

The average accuracy for control questions was 0.76(CI = 0.73 - 0.78) and the average accuracy for experimenter questions was 0.81(CI = 0.73 - 0.83). There was no significant difference in accuracy between conditions, $t = -4.83$, $p = 0.00$.

To assess whether participants who more strongly agreed with EL attitudes were at an advantage for understanding and remembering the child development articles they read, we fit a bayesian logistic mixed-effects regression with the following structure: `accuracy ~ AA PAQ score * article type + EL PAQ score * article type + RR PAQ score * article type + (article type | subject) + (1 | item)`. We excluded 7.70% of responses from analyses because participants spent fewer than 15 seconds reading the article, our pre-determined minimum reading time.

We found that participants who agreed more strongly with EL attitudes were more likely to answer uptake questions correctly overall ($\beta = 0.82$, 95% CI = 0.52 - 1.14), but there was no interaction between EL scores and article type, meaning that there was no advantage for people with higher EL scores for understanding child development content in particular. However, unexpectedly, there was an interaction between AA attitudes and article type ($\beta = 0.42$, 95% CI = 0.11 - 0.73), such that people with stronger AA attitudes performed better on questions about child development articles compared to control articles.

References

Table 1

Results of separate bayesian ordinal logistic regressions of demographic factors on agreement with AA, EL, and RR attitudes.

Subscale	Factor	Estimate	Est. Error	Lower 95% CI	Upper 95% CI
AA	Parent Age	-0.00	0.01	-0.01	0.01
	Hispanic or Latino	0.72	0.20	0.34	1.11
	Multiple Ethnicities	0.50	0.16	0.18	0.82
	White	0.31	0.09	0.12	0.49
	Parent Education	0.02	0.02	-0.01	0.05
	Number of children	-0.14	0.05	-0.24	-0.03
	Male	-0.70	0.11	-0.92	-0.48
EL	Parent Age	0.01	0.01	-0.00	0.02
	Hispanic or Latino	0.26	0.19	-0.12	0.64
	Multiple Ethnicities	0.56	0.17	0.22	0.90
	White	0.44	0.09	0.25	0.62
	Parent Education	0.02	0.02	-0.01	0.05
	Number of children	-0.14	0.05	-0.24	-0.03
	Male	-0.18	0.11	-0.41	0.04
RR	Parent Age	-0.00	0.01	-0.01	0.01
	Hispanic or Latino	0.27	0.20	-0.11	0.67
	Multiple Ethnicities	-0.02	0.17	-0.34	0.31
	White	-0.20	0.10	-0.38	-0.01
	Parent Education	-0.02	0.02	-0.05	0.01
	Number of children	0.15	0.06	0.04	0.25
	Male	-0.17	0.12	-0.39	0.06

Table 2

Results of separate bayesian ordinal logistic regressions of PAQ scores and child age on frequency of parenting behaviors in Affection and Attachment (AA), Early Learning (EL), and Rules and Respect (RR) categories.

Behavior Category	Factor	Estimate	Est. Error	Lower 95% CI	Upper 95% CI
AA	AA PAQ score	0.81	0.15	0.53	1.12
	RR PAQ score	-0.02	0.11	-0.24	0.19
	EL PAQ score	-0.01	0.14	-0.30	0.26
	Child Age	0.01	0.01	-0.00	0.02
EL	AA PAQ score	0.37	0.18	0.02	0.71
	RR PAQ score	0.20	0.13	-0.06	0.45
	EL PAQ score	0.52	0.18	0.18	0.88
	Child Age	0.01	0.01	-0.00	0.03
RR	AA PAQ score	0.10	0.21	-0.30	0.50
	RR PAQ score	0.34	0.15	0.05	0.63
	EL PAQ score	0.02	0.21	-0.40	0.42
	Child Age	0.03	0.01	0.01	0.05

Table 3

Behaviors that parents were asked to report on, and their corresponding attitude categories.

Category	In the last month, how often did...
AA	you and your child talk about feelings (e.g., when he/she was sad/angry)?
	you and your child spend time cuddling?
	your child sleep in the same bed as you?
	you hug or kiss your child?
EL	you read to your child?
	you practice numbers or letters with your child?
	you share facts or observations about the world when you were doing other tasks (e.g., did you know butter comes from cows? while shopping at the grocery store)?
	your child watch educational programming (e.g., shows like Sesame Street) or play with educational apps (e.g., apps designed to teach numbers, colors, shapes, etc.) on a tablet or mobile device?
RR	you talk sternly to your child when he/she did something you dont want?
	you give your child time out or other punishments for acting out?
	you talk about setting limits with your child (e.g., only 10 minutes of screen time or no hitting)?
	your child help or try to help with chores or tasks (including cleaning up his/her toys)?

Table 4

Results of a bayesian logistic regression of PAQ scores and article topic (EL vs. control) on memory for information in articles.

Factor	Estimate	Est. Error	Lower 95% CI	Upper 95% CI
EL Articles	-0.21	0.75	-1.68	1.29
AA PAQ score	0.05	0.15	-0.25	0.35
RR PAQ score	-0.21	0.11	-0.42	0.01
EL PAQ score	0.82	0.16	0.52	1.14
AA PAQ score * EL Articles	0.42	0.16	0.11	0.73
RR PAQ score * EL Articles	0.02	0.11	-0.19	0.23
EL PAQ score * EL Articles	-0.27	0.16	-0.58	0.05

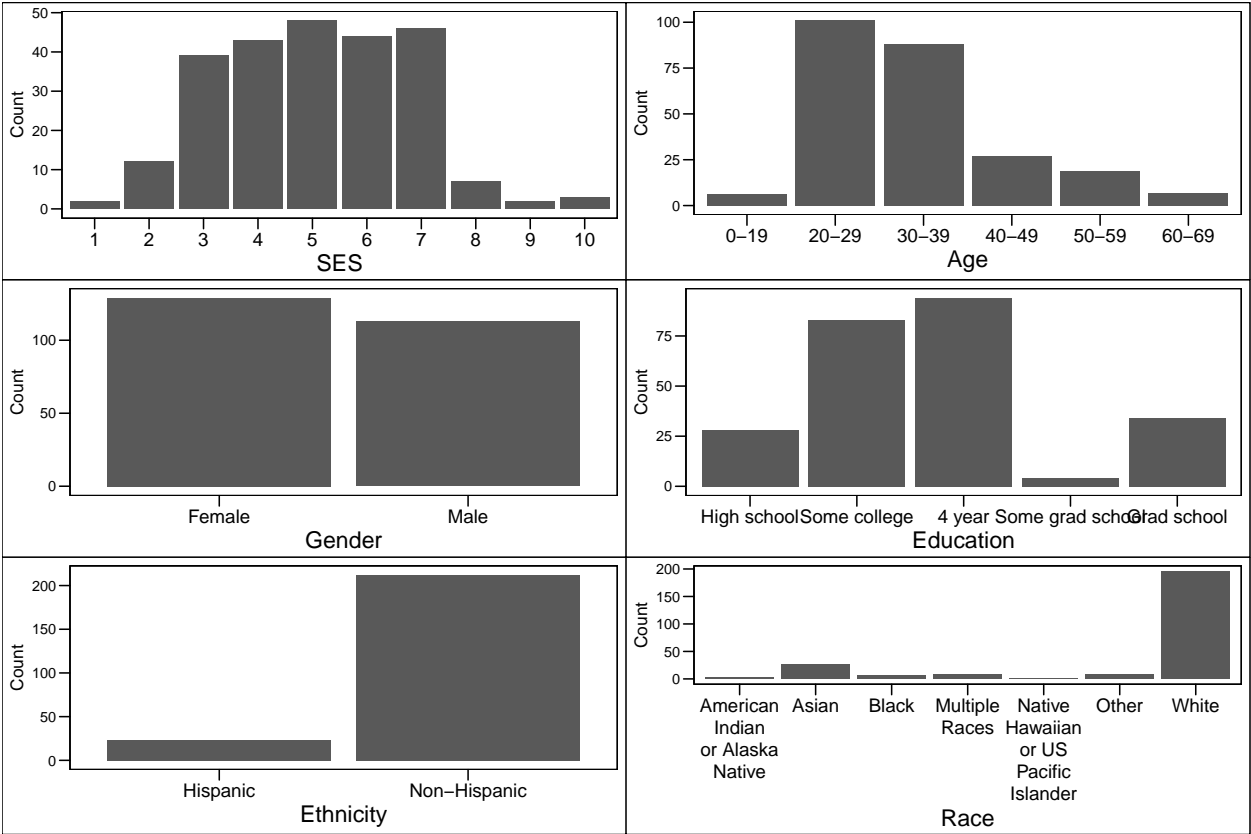


Figure 1. Demographic information for participants in the final norming sample.

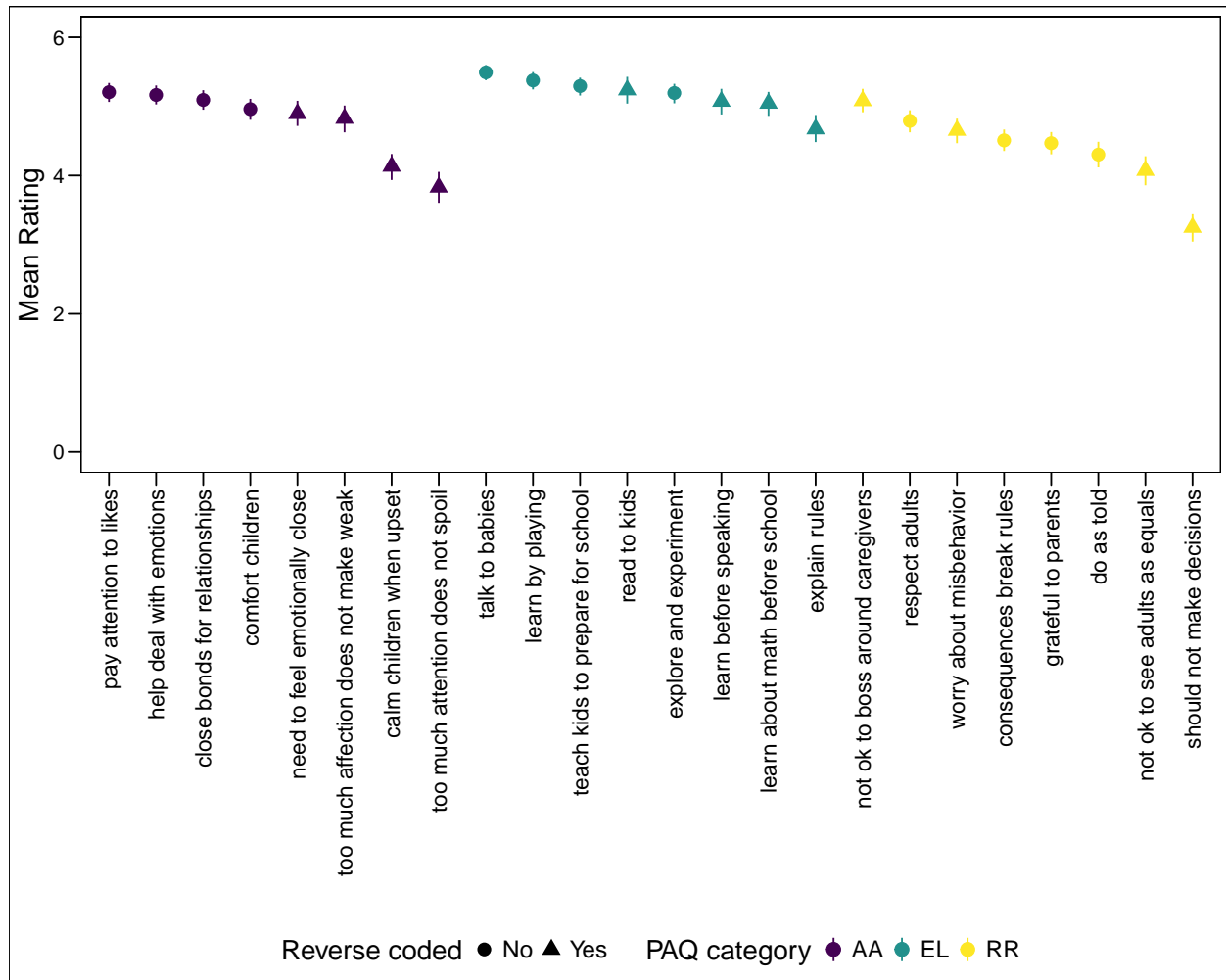


Figure 2. Average ratings for individual PAQ items.

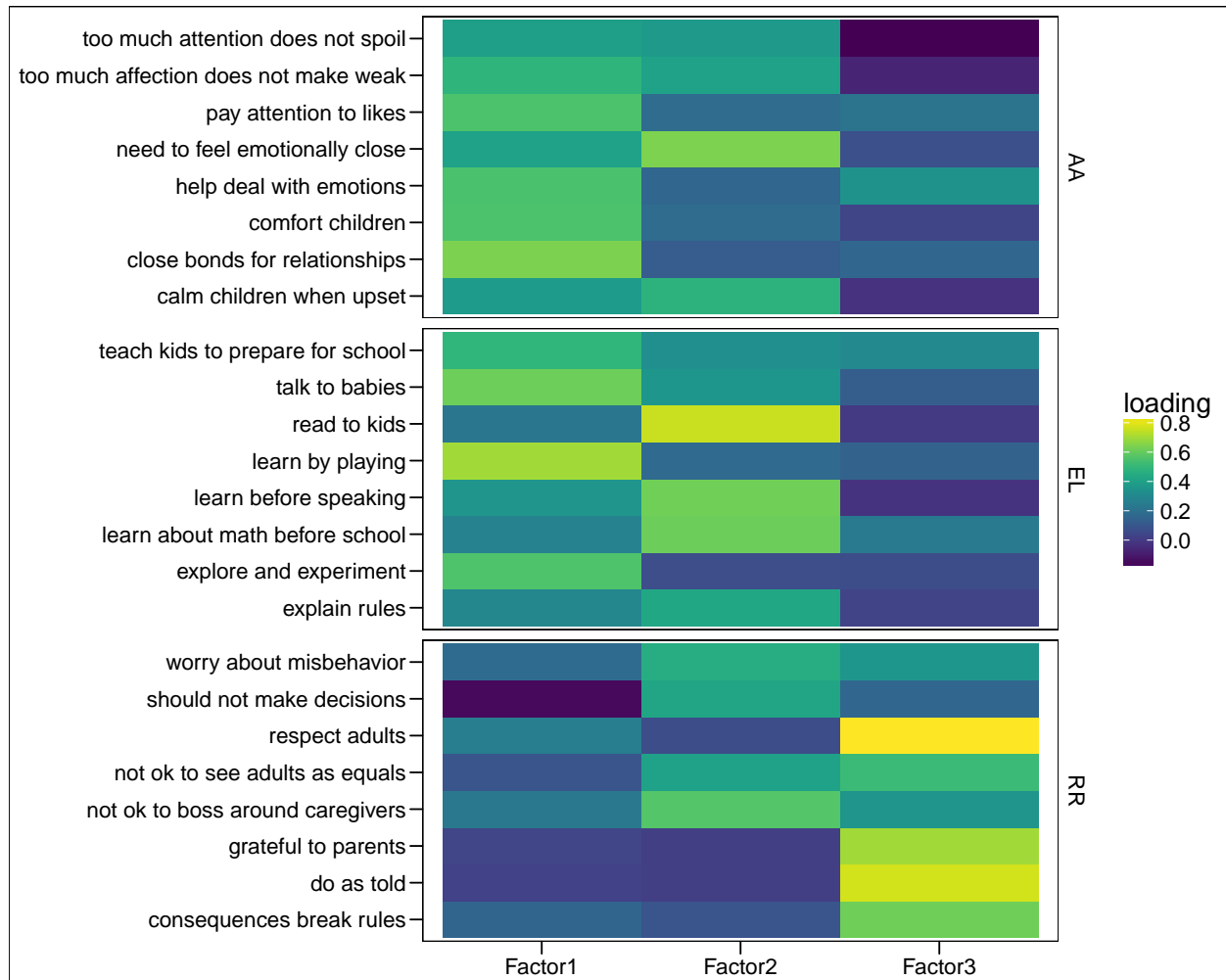


Figure 3. Factor loadings on individual PAQ questions.

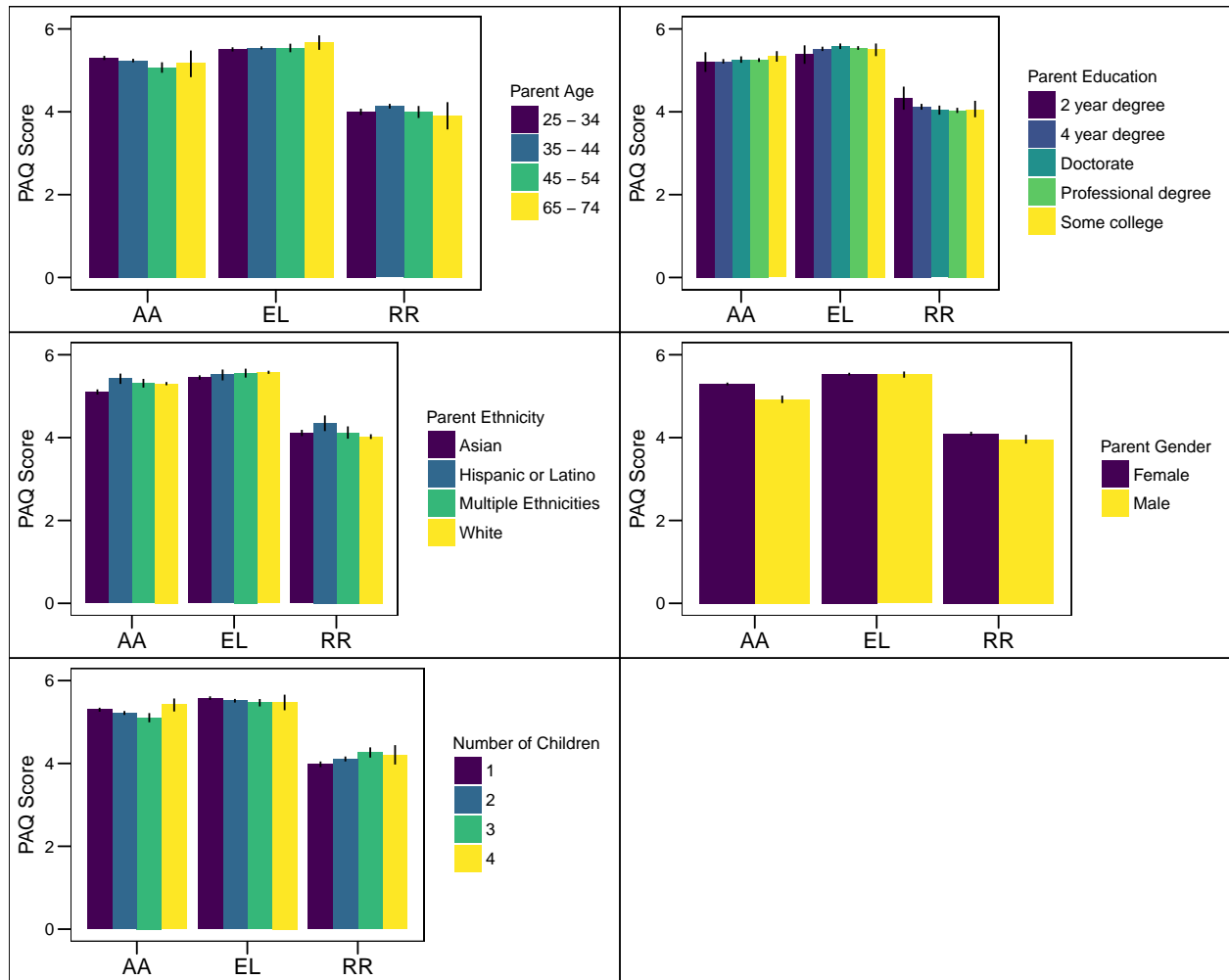


Figure 4. Demographic variability in PAQ scores. Error bars represent +/-95% CI computed by non-parametric bootstrap.

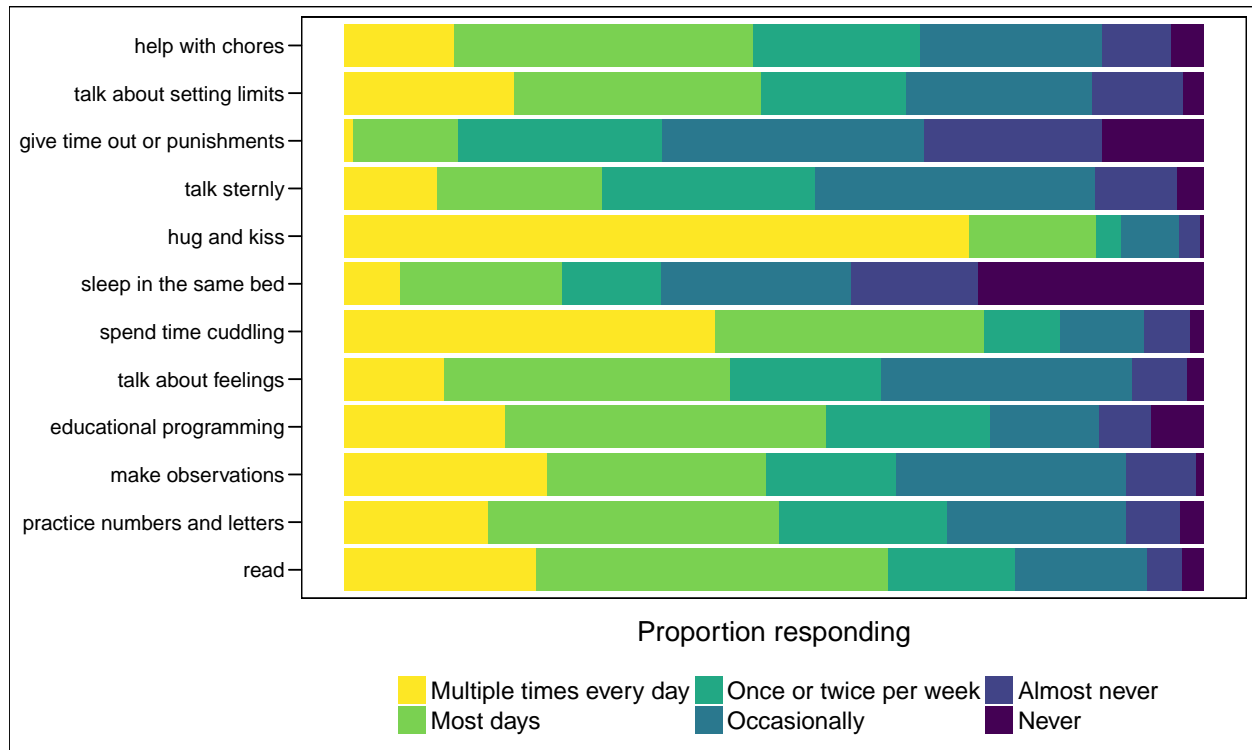


Figure 5. Frequencies of parenting activities reported by parents.

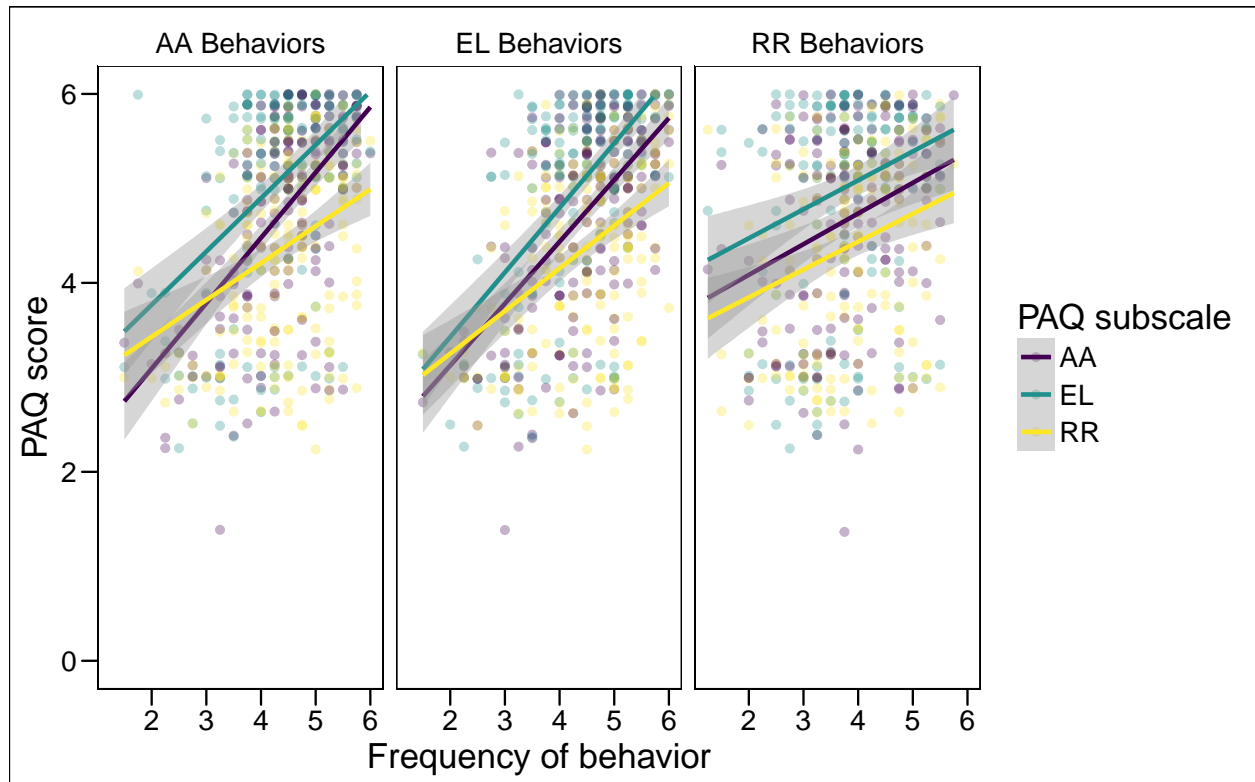


Figure 6. Relations between PAQ scores (Affection and Attachment, Early Learning, and Rules and Respect) and the frequency of parenting behaviors divided into the same categories.

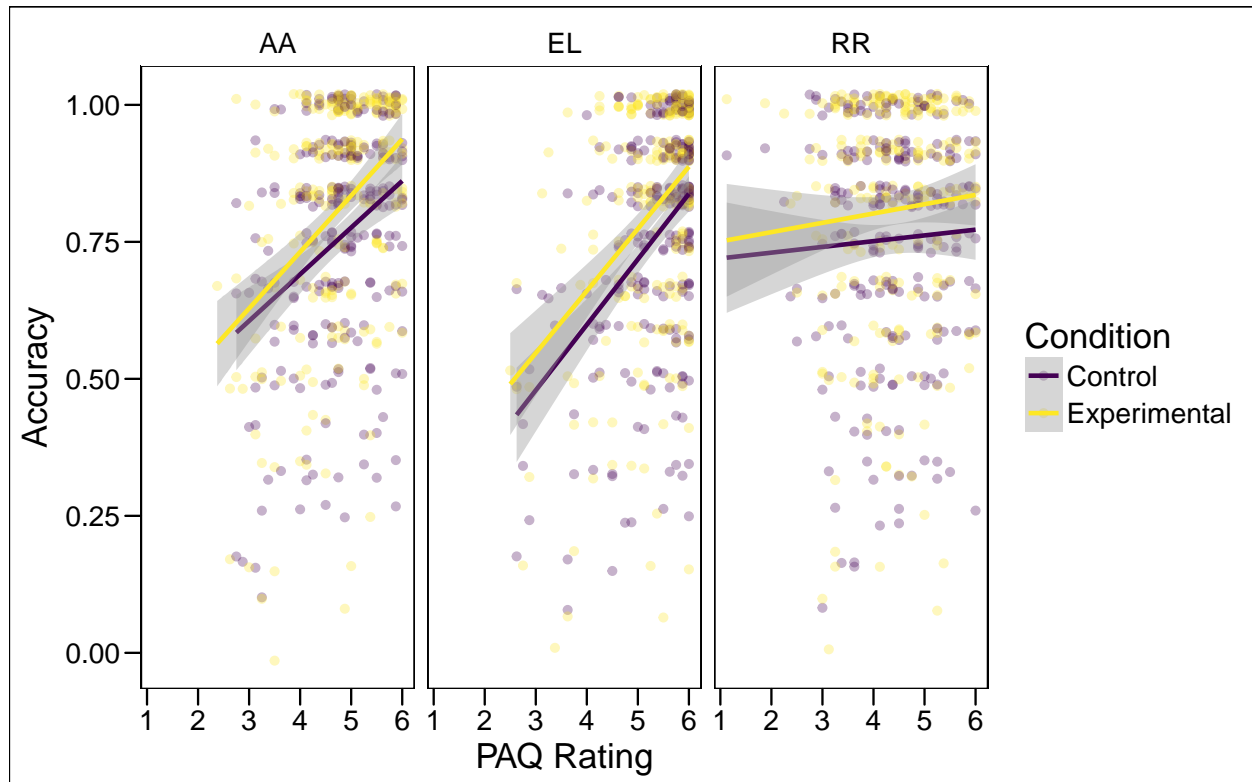


Figure 7. Relations between PAQ scores (Affection and Attachment, Early Learning, and Rules and Respect) and the uptake of information in experimental (child development-related) and control articles.