ONLINE APPENDIX

FOR

USING BEHAVIORAL INSIGHTS TO INCREASE PARENTAL ENGAGEMENT: THE PARENTS AND CHILDREN TOGETHER (PACT) INTERVENTION

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A.1 Recruitment

We recruited parents at eight subsidized preschool programs in Chicago, Illinois. These centers were selected for several reasons: they represented the diversity of centers in Chicago, they are large, and they are located in areas accessible for our research assistants. The centers were located throughout the city and have a racially and ethnically diverse population as we document in the main text in our paper. Figure A.1.1 presents a map of the City of Chicago with the geo-referenced preschools.

Figure A.1.1 PACT Preschool Centers in the Chicago Area
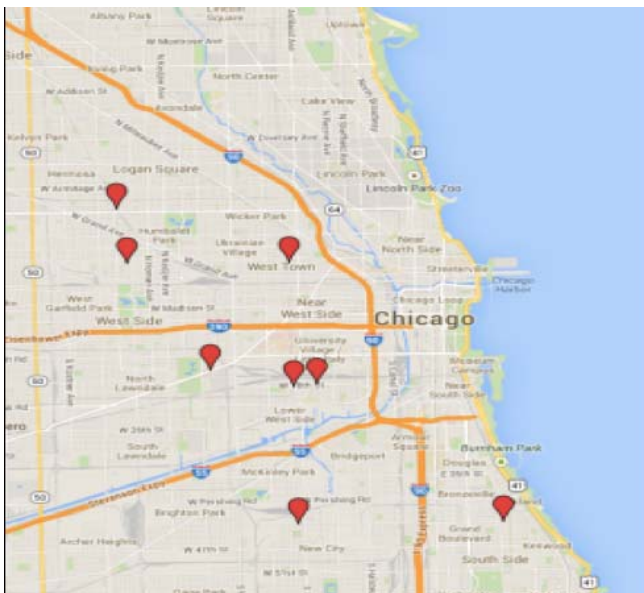
Together these preschool programs served about 965 children at the time we began recruiting at the beginning of the 2014-2015 school year. Given that the material we developed for our treatment was in English or Spanish, parents and children who did not speak these languages were not eligible for PACT. Based on conversations with the staff of the preschools we estimate that about 15 percent of the 965 children were not eligible due to the language condition. We estimate that an additional 15 percent were siblings of another child in the center and only one sibling could be a focal child in PACT. Therefore, across the 8 centers, about 580 children were eligible to participate in PACT.

We spent between 6-10 hours in each center inviting parents to participate when they dropped off or picked up their children. Of the estimated 580 children whose parents

were eligible, 313 signed up on site and we were able to contact 220 of these parents. The main reason that we could not contact parents was that the phone number we had was not accurate. Among this group, 51 parents declined to participate. The main reason for not participating was not having time to complete the orientation session, which we describe below. In the end, 169 parents agreed to participate in the PACT intervention.

A.2 Orientation Sessions and Randomization

All participating parents were given an immediate on-site orientation session, that took about 30 minutes on average. Prior to the orientation parents were randomly assigned to the treatment and the control group. Once parents agreed to participate in PACT they were assigned an electronic tablet to borrow for the six-week intervention. Each tablet had a numeric identifier, known by the research team only. Parents assigned tablets with even identifiers were assigned to the treatment group (N=84), while odd identifiers were assigned to the control group (N=85). Tablets for the treatment group were assigned to every other parent who agreed to participate.

During the orientation parents signed all necessary forms and were instructed in the use of the tablet and the reading application.[1] During the orientation parents in both the control and treatment groups were asked to watch six short instructional videos. Two of these were on how to use the reading application and four were an introduction to the PACT study. Parents were required to sign a consent form, and a pledge to borrow, safeguard, and return the tablet at the end of the program.

While under the supervision of our research team, all parents were given the opportunity to try the digital reading application on their own with a hard copy set of directions that they followed at their own pace. In doing so, they made a video of themselves using the reading application on the tablet, mimicking what they would do when reading to their child.

At the end of the orientation sessions, all parents took a short survey on the tablet. This was the first of three surveys that we administered during the intervention, as we explain in the next section.

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[1] The remaining functionalities of the tablet such Internet access or additional applications were disabled.

A.3 Survey Response

        We collected data in 3 surveys. Survey 1, administered during the orientation session, asked parents to report characteristics of the child, the household, and themselves. Survey 2 was a time preference assessment that we discuss below. Survey 3 was administered at the end of the six-week intervention. It asked questions about parenting beliefs and practices. Table A.3.1 show the number of parents who answered each survey, by treatment status. Almost all parents completed Survey 1 (95%), while two thirds answered Surveys 2 and 3.

Table A.3.1 Survey response

	Treatment	Control	Total	% Total
All Recruited Parents	84	85	169	100%
Answered Survey 1	80	80	160	95%
Answered Survey 2	59	53	112	66%
Answered Survey 3	56	56	112	66%

Note: The first row shows the number of parents that were recruited to participate in the PACT study, by treatment status. These correspond to all 169 parents that signed the consent forms, participated of the orientation sessions and received the tablet. The number of parents answering surveys 1, 2 and 3 are shown in the last three rows, respectively.

A.4 Representativeness of PACT Participants

        Overall the parents participating in the PACT intervention are similar to a national sample of parents of children in Head Start programs on characteristics collected in the Head Start Family and Child Experiences Survey (FACES) survey except that a higher proportion of PACT families are Spanish speaking and Hispanic, which is not surprising because language was an eligibility criteria for participation in PACT.

        Table A.4.1 reports the comparison of the PACT participants to the parents of children entering Head Start in 2010, the latest year FACES data is available.

Table A.4.1 Percent of parents in the PACT sample and parents of children entering Head Start in 2010 with various characteristics

	Head Start FACES	PACT
Speaks English at home[*]	73.7	74.4
Education		
Less than HS	31.8	27.5

High school diploma or GED	35.2	17.5
Some college (including 2-year degrees)	25.3	41.9
BA or more schooling	7.8	13.1
Race/ethnicity		
African American	33.0	32.1
Hispanic/Latino	36.0	65.2
Employment status		
Child has disability	14.1	12.0

Note: Primary language spoken to child at home is English; took survey in English

A.5 Time Preferences

Our main hypothesis about why disadvantaged parents spend less educational time with their children is that disadvantaged parents are prone to impatience or that they have a high discount rate for the future. We examine if parents in our sample who are more future-oriented read more and respond to the behavioral tools more than parents in our sample who are more present-oriented.

A.5.1 Time Preferences Task

Following Andreoni and Sprenger (2012, 2013), we designed a survey to measure time preferences. This survey corresponds to the PACT Survey 2, which was administered on electronic tablets after random assignment to parents in both the treatment and control groups. Parents were given a set of instructions and an example before they began the task. They were given the opportunity to ask questions before the task and during it. Instructions and an example were also available in an audio recording on the tablet that parents could play at any time while they performed the task. All the parents in a particular center were given the time preference task on the same day. To induce parents to answer truthfully, all respondents were entered into a lottery and one parent was randomly selected to actually receive the payout. For that parent the actual amount and time for the payout was determined by randomly selecting one of the 15 payouts that the parent preferred. Parents always had a greater than one in ten chance of receiving a payout and they were informed of these odds prior to participating in the task.

Parents were asked to choose between an amount of money that they could receive immediately or an amount that they could receive later. In total, each parent answered 15 of these questions. In an effort to simplify the choice situation, each of the questions offered four choices only (two inner solutions and two corner solutions), as in Andreoni, Kuhn, and Sprenger (2013). The first five questions offered payments immediately and three weeks later, the next five questions offered payments immediately and six weeks later, and the last five questions offered payments in three and six weeks. Within each time horizon, each question presented an increasing price compared to the earlier payment. The set of choices is presented below. The 3 and 6- week time horizons were chosen because the intervention lasted six weeks so the payout could be made during and/or at the end of the intervention.

A.5.2 Time Preferences Estimation

We use the Convex Time Budget (CTB)[2] method (first introduced by Andreoni and Sprenger 2012) to estimate both a discount rate for parents and their present bias, which have shown to best predict outcomes in previous research (Burks et al. 2012). We follow closely Andreoni, Kuhn, and Sprenger (2013) and assume that parents have preferences for the experimental payments X in period t and t+k can be represented by a utility function $U(X_t, X_{t+k})$. U is a time-separable, constant relative risk averse function with a quasi-hyperbolic structure for discounting (Laibson 1997; O'Donoghue and Rabin 1999), given by:

$$U(X_t, X_{t+k}) = X_t^\alpha + \beta^{t0} \gamma^k X_{t+k}^\alpha$$

that parents maximize subject to a budget constraint given by,

$$PX_t + X_{t+k} = Y$$

where, t_0 is an indicator function that takes value 1 if time t is in the present; β denotes the extent of present bias; γ denotes the individual's discount rate; α denotes the curvature of the utility function; P denotes the price ratio or gross interest rate; and Y denotes the

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[2] The CTB method identifies the curvature in the utility function over time by estimating a respondent's sensitivity to changing interest rates. The key in using this approach is to vary the implicit interest rate in the options presented across subsequent sets of options. The sensitivity to changing interest rates across the question sequences identifies the utility curvature; the time preference is identified through the stated preference over the timing of payments.

total experimental budget.

The first order conditions from maximizing the utility function subject to the budget constraint yield the standard condition,

$$\frac{\delta U(X_t, X_{t+k})}{\delta X_t} \Bigg/ \frac{\delta U(X_t, X_{t+k})}{\delta X_{t+k}} = P$$

indicating that the ratio of the marginal utilities from the earlier payment and later payments should equalize the price ratio P. This implies that

$X_t / X_{t+k} = (P\beta^{t0}\gamma^k)^{1/\alpha-1}$

Taking logs,

$\ln (X_t/X_{t+k}) = [\ln (\beta)/(\alpha-1)]t_0 + [\ln (\gamma)/(\alpha-1)]k + [1/(\alpha-1)] \ln(P)$

$\ln (X_t/X_{t+k}) = \pi_0 t_0 + \pi_1 k + \pi_2 \ln(P)$

Assuming an additive error structure, the estimation from the equation above provides us reduced form parameters (π_0, π_1, π_2) that allow us to identify our structural parameters α, β and γ. We compute the associated standard errors using the delta method. From the equation, it can be ascertained that the variation in P identifies α; variation in k identifies γ; and variation in t_0 identifies β. The interpretation of the structural parameters is as follows. If $\alpha = 1$ the utility function is linear. If $\alpha < 1$ individuals have convex preferences in (sooner, later) space. More curvature implies that individuals prefer interior solutions (they prefer to spread payments) over corner solutions. Lower γ implies less weight to the future, or more patience. If $\beta = 1$ there is no present bias. If $\beta < 1$, there is present bias.

A.5.3 Time Preferences Questionnaire

Payout Question 1 of 15

Look at the four ways you could get money if you win. You get some money this week, and the rest in three weeks.

Click on the button next to the choice you like best.

⦿ **Choice A**
$24 guaranteed this week   and $0 in 3 weeks
○ **Choice B**
$16 guaranteed this week   and $8 guaranteed in 3 weeks
○ **Choice C**
$8 guaranteed this week   and $16 guaranteed in 3 weeks
○ **Choice D**
$0 this week   and $24 guaranteed in 3 weeks

Payout Question 2 of 15

Each page has four different ways you could get your money if you win.

Look at the choices and click on the button next to the **one** choice you like best.

- ⦿ **Choice A**
  $21 guaranteed this week   and $0 in 3 weeks
- ○ **Choice B**
  $14 guaranteed this week   and $8 guaranteed in 3 weeks
- ○ **Choice C**
  $7 guaranteed this week   and $16 guaranteed in 3 weeks
- ○ **Choice D**
  $0 this week   and $24 guaranteed in 3 weeks

Payout Question 3 of 15

Here are four different ways to get the money if you win.

Click on the button next to the **one** choice you like best.

- ⦿ **Choice A**
  $18 guaranteed this week   and $0 in 3 weeks
- ○ **Choice B**
  $12 guaranteed this week   and $8 guaranteed in 3 weeks
- ○ **Choice C**
  $6 guaranteed this week   and $16 guaranteed in 3 weeks
- ○ **Choice D**
  $0 this week   and $24 guaranteed in 3 weeks

Payout Question 4 of 15

Which of these do you like better?

- ○ **Choice A**
  $15 guaranteed this week   and $0 in 3 weeks
- ○ **Choice B**
  $10 guaranteed this week   and $8 guaranteed in 3 weeks
- ○ **Choice C**
  $5 guaranteed this week   and $16 guaranteed in 3 weeks
- ○ **Choice D**
  $0 this week   and $24 guaranteed in 3 weeks

Payout Question 5 of 15

If you win, which way would you like to be paid? Choose **one** by clicking next to it.

- ⦿ **Choice A**
  $12 guaranteed this week   and $0 in 3 weeks
- ○ **Choice B**
  $8 guaranteed this week   and $8 guaranteed in 3 weeks
- ○ **Choice C**
  $4 guaranteed this week   and $16 guaranteed in 3 weeks
- ○ **Choice D**
  $0 this week   and $24 guaranteed in 3 weeks

Payout Question 6 of 15

Please Note: Now the choices include money this week and in *six* weeks. Pick the one you like most.

- ⦿ **Choice A**
  $24 guaranteed this week   and $0 in 6 weeks
- ○ **Choice B**
  $16 guaranteed this week   and $8 guaranteed in 6 weeks
- ○ **Choice C**
  $8 guaranteed this week   and $16 guaranteed in 6 weeks
- ○ **Choice D**
  $0 this week   and $24 guaranteed in 6 weeks

Payout Question 7 of 15

This is a new set of choices but the payouts are still this week **and in six weeks. Please choose one.**

○ **Choice A**
$21 guaranteed this week   and $0 in 6 weeks

○ **Choice B**
$14 guaranteed this week   and $8 guaranteed in 6 weeks

○ **Choice C**
$7 guaranteed this week   and $16 guaranteed in 6 weeks

○ **Choice D**
$0 this week   and $24 guaranteed in 6 weeks

Payout Question 8 of 15

Which _one_ of these choices do you prefer? Remember that if you win, you will get your money on one of the schedules that you pick in this survey.

◉ **Choice A**
$18 guaranteed this week   and $0 in 6 weeks

○ **Choice B**
$12 guaranteed this week   and $8 guaranteed in 6 weeks

○ **Choice C**
$6 guaranteed this week   and $16 guaranteed in 6 weeks

○ **Choice D**
$0 this week   and $24 guaranteed in 6 weeks

Payout Question 9 of 15

Now four different choices. Which _one_ of these do you like best?

○ **Choice A**
$15 guaranteed this week   and $0 in 6 weeks

○ **Choice B**
$10 guaranteed this week   and $8 guaranteed in 6 weeks

○ **Choice C**
$5 guaranteed this week   and $16 guaranteed in 6 weeks

○ **Choice D**
$0 this week   and $24 guaranteed in 6 weeks

Payout Question 10 of 15

Please select the payout you like best of these four:

◉ **Choice A**
$12 guaranteed this week   and $0 in 6 weeks

○ **Choice B**
$8 guaranteed this week   and $8 guaranteed in 6 weeks

○ **Choice C**
$4 guaranteed this week   and $16 guaranteed in 6 weeks

○ **Choice D**
$0 this week   and $24 guaranteed in 6 weeks

Payout Question 11 of 15

Please note: now the money comes partly in _three_ weeks and partly in _six_ weeks. Pick the one you prefer.

◉ **Choice A**
$24 guaranteed in 3 weeks   and $0 in 6 weeks

○ **Choice B**
$16 guaranteed in 3 weeks   and $8 guaranteed in 6 weeks

○ **Choice C**
$8 guaranteed in 3 weeks   and $16 guaranteed in 6 weeks

○ **Choice D**
$0 in 3 weeks   and $24 guaranteed in 6 weeks

Payout Question 12 of 15

The choices continue to combine payments in *three weeks* and in *six weeks*.
Click a button beside the one you like best.

- **Choice A**
  $21 guaranteed in 3 weeks and $0 in 6 weeks
- **Choice B**
  $14 guaranteed in 3 weeks and $8 guaranteed in 6 weeks
- **Choice C**
  $7 guaranteed in 3 weeks and $16 guaranteed in 6 weeks
- **Choice D**
  $0 in 3 weeks and $24 guaranteed in 6 weeks

Payout Question 13 of 15

Pick the one you like best from these choices:

- **Choice A**
  $18 guaranteed in 3 weeks and $0 in 6 weeks
- **Choice B**
  $12 guaranteed in 3 weeks and $8 guaranteed in 6 weeks
- **Choice C**
  $6 guaranteed in 3 weeks and $16 guaranteed in 6 weeks
- **Choice D**
  $0 in 3 weeks and $24 guaranteed in 6 weeks

Payout Question 14 of 15

If you win, which of these payment schedules would you pick?

- **Choice A**
  $15 guaranteed in 3 weeks and $0 in 6 weeks
- **Choice B**
  $10 guaranteed in 3 weeks and $8 guaranteed in 6 weeks
- **Choice C**
  $5 guaranteed in 3 weeks and $16 guaranteed in 6 weeks
- **Choice D**
  $0 in 3 weeks and $24 guaranteed in 6 weeks

Payout Question 15 of 15

This is your last set of choices! Please select the one you like best.

- **Choice A**
  $12 guaranteed in 3 weeks and $0 in 6 weeks
- **Choice B**
  $8 guaranteed in 3 weeks and $8 guaranteed in 6 weeks
- **Choice C**
  $4 guaranteed in 3 weeks and $16 guaranteed in 6 weeks
- **Choice D**
  $0 in 3 weeks and $24 guaranteed in 6 weeks

A.6 Robustness Checks

A.6.1 By Survey Response

Table 6.1.1 Treatment effect for participants by completion of each of the three surveys

Panel 1. Dependent Variable: Reading Time				
	(1)	(2)	(3)	(4)
Treatment	88.32***	83.00***	82.12***	88.88***
	(18.79)	(19.35)	(24.08)	(24.71)
Constant	63.34***	66.51***	83.61***	82.81***
	(9.49)	(9.95)	(14.11)	(13.44)

SD Control Group	87.48	89.02	102.76	100.61
Effect Size	1.01	.93	.80	.88
Sample	All	Survey 1	Survey 2	Survey 3
Observations	169	160	112	112

Panel 2. Dependent Variable: Number of Books

	(1)	(2)	(3)	(4)
Treatment	16.66***	15.80***	14.29**	15.77**
	(4.50)	(4.69)	(6.08)	(6.10)
Constant	14.78***	15.57***	19.83***	19.59***
	(3.00)	(3.17)	(4.63)	(4.39)
SD Control Group	27.68	28.34	33.72	32.87
Effect Size	.60	.56	.42	.48
Sample	All	Survey 1	Survey 2	Survey 3
Observations	169	160	112	112

Panel 3. Dependent Variable: Any Reading

	(1)	(2)	(3)	(4)
Treatment	0.12**	0.09**	0.06	0.04
	(0.05)	(0.04)	(0.05)	(0.04)
Constant	0.84***	0.87***	0.91***	0.93***
	(0.04)	(0.04)	(0.04)	(0.03)
SD Control Group	.37	.33	.30	.26
Effect Size	.31	.26	.20	.14
Sample	All	Survey 1	Survey 2	Survey 3
Observations	169	160	112	112

Notes: Robust standard errors in parentheses. Significance levels: * p<0.10, ** p<0.05, *** p<0.01. Column 1: considers all 169 parents (84 in the treatment group, and 85 in the control group). Column 2: considers the 160 parents that answered survey 1 (80 in the treatment group, and 80 in the control group). Column 3: considers the 112 parents that answered survey 2 (59 in the treatment group, and 53 in the control group). Column 4: considers the 112 parents that answered survey 2 (56 in the treatment group, and 56 in the control group). SD Control Group is the standard deviation of the control group for the respective dependent variable. The effect size is the ratio of the coefficient for the treatment group to the standard deviation of the control group.

A.6.2 Excluding Outliers

Table 6.2.1 Robustness check: Excluding outliers

Panel 1. Dependent Variable: Reading Time

	(1)	(2)	(3)	(4)
Treatment	88.32***	86.48***	72.48***	51.30***
	(18.79)	(15.57)	(13.74)	(10.75)
Constant	63.34***	56.69***	56.69***	52.67***
	(9.49)	(6.85)	(6.85)	(5.62)
SD Control Group	87.48	62.78	62.78	51.16
Effect Size	1.01	1.38	1.15	1.00
Excluding Parents that read more than	-	600 minutes	450 minutes	300 minutes
Observations	169	167	164	155

Panel 2. Dependent Variable: Number of Books

	(1)	(2)	(3)	(4)
Treatment	16.66***	17.41***	15.25***	12.23***
	(4.50)	(3.19)	(2.91)	(2.52)
Constant	14.78***	12.17***	12.17***	11.43***
	(3.00)	(1.50)	(1.50)	(1.33)
SD Control Group	27.68	13.77	13.77	12.1
Effect Size	0.60	1.26	1.11	1.01
Excluding Parents that read more than	-	600 minutes	450 minutes	300 minutes
Observations	169	167	164	155

Panel 3. Dependent Variable: Any Reading

	(1)	(2)	(3)	(4)
Treatment	0.12**	0.12**	0.12**	0.11**
	(0.05)	(0.05)	(0.05)	(0.05)
Constant	0.84***	0.83***	0.83***	0.83***
	(0.04)	(0.04)	(0.04)	(0.04)
SD Control Group	.37	.37	.37	.38
Effect Size	.31	.32	.31	.30
Excluding Parents that read more than	-	600 minutes	450 minutes	300 minutes
Observations	169	167	164	155

Notes: Robust standard errors in parentheses. Significance levels: * p<0.10, ** p<0.05, *** p<0.01. Column 1: considers all 169 parents Column 2: excludes parents that read more than 600 minutes (1 from the control group, 1 from the treatment group). Column 3: excludes parents that read more than 450 minutes (1 from the control group, 4 from the treatment group). Column 4: excludes parents that read more than 300 minutes (2 from the control group, 12 from the treatment group). Column 5: excludes parents that did not read at all (14 from the control group, 4 from the treatment group). SD Control Group is the standard deviation of the control group for the respective dependent variable. The effect size is the ratio of the coefficient for the treatment group to the standard deviation of the control group.

A.6.3 Covariates, Preschool Fixed Effects and Clustering

Table A.6.3.1 Robustness check: Covariates, preschool fixed effects and clustering

Panel 1. Dependent Variable: Reading Time

	(1)	(2)	(3)	(4)	(5)
Treatment	88.32***	79.50***	80.09***	83.03***	83.03**
	(18.79)	(20.00)	(19.27)	(21.07)	(26.06)
Constant	63.34***	66.87***	44.98***	68.13	68.13
	(9.49)	(10.25)	(14.26)	(101.14)	(131.74)
SD Control Group	87.48	89.89	89.89	89.89	89.89
Effect Size	1.01	.88	.89	.92	.92
School Fixed Effects	No	No	Yes	Yes	Yes
Covariates	No	No	No	Yes	Yes
Clustering	No	No	No	No	Yes
Observations	169	151	151	151	151

Panel 2. Dependent Variable: Number of Books

	(1)	(2)	(3)	(4)	(5)
Treatment	16.66***	15.32***	15.11***	16.35***	16.35*

	(4.50)	(4.92)	(4.73)	(5.30)	(8.05)
Constant	14.78***	15.96***	12.05***	16.57	16.57
	(3.00)	(3.28)	(3.23)	(27.13)	(35.25)
SD Control Group	27.68	28.8	28.8	28.8	28.8
Effect Size	.60	.53	.52	.57	.57
School Fixed Effects	No	No	Yes	Yes	Yes
Covariates	No	No	No	Yes	Yes
Clustering	No	No	No	No	Yes
Observations	169	151	151	151	151

Panel 3. Dependent Variable: Any Reading

	(1)	(2)	(3)	(4)	(5)
Treatment	0.12**	0.10**	0.10**	0.12***	0.12**
	(0.05)	(0.04)	(0.04)	(0.05)	(0.04)
Constant	0.84***	0.87***	0.91***	0.69***	0.69***
	(0.04)	(0.04)	(0.05)	(0.18)	(0.18)
SD Control Group	.37	.34	.34	.34	.34
Effect Size	.31	.30	.31	.36	.36
School Fixed Effects	No	No	Yes	Yes	Yes
Covariates	No	No	No	Yes	Yes
Clustering	No	No	No	No	Yes
Observations	169	151	151	151	151

Notes: Robust standard errors in parentheses. Significance levels: * p<0.10, ** p<0.05, *** p<0.01. Column 1: considers all 169 parents. Columns 2-5: excludes parents with missing covariates. SD Control Group is the standard deviation of the control group for the respective dependent variable. The effect size is the ratio of the coefficient for the treatment group to the standard deviation of the control group.

A.6.4 Time Preferences Sensitivity

From our 169 PACT parents, 112 parents answered the time orientation task. Of the 84 treated parents, 59 participated in the time preference task (70%). Of the 85 control group parents, 53 participated (62%). The difference of 8 percentage points is not significant at 5% (nor at 10%).

Table A.6.4.1 T-test for participation in Survey 2 by treatment status

Variable	Total Sample	Treatment	Control	Difference	*p*
Participation in Survey 2 (%)	0.663	0.702	0.624	0.078	0.281

Of the 112 parents who took the time orientation task, 28 gave the same answer to all the 15 time orientation questions, leaving us with 84 parents for whom we could compute a discount rate. Conditional on answering the survey (N=112), there is no significant difference whether response had variation in their answers by treatment status:

Table A.6.4.2 T-test for variation in Survey 2 answers by treatment status

Variable	Survey 2 Sample	Treatment	Control	Difference	p
Variation in Survey 2 Answers (%)	0.750	0.729	0.774	-0.045	-0.542

We computed the time discounting (delta) parameter for the 84 parents with variation in their answers to the time orientation task. We label this sample "With Time Preferences A." From the 84 parents, we distinguish:

- "Less Patient Parents A" are those whose score is below the median. (N=42)
- "More Patient Parents A" are those whose score is above the median. (N=42)

This measure of patience is not correlated with treatment status, as presented in table A.6.4.3 below.

Table A.6.4.3 T-test for More/Less Patient A by treatment status

Variable	Survey 2 Sample	Treatment	Control	Difference	p
More Patient A (%)	0.500	0.535	0.463	0.071	0.518

We then classified the 28 parents with no variation in their answers as:

- "Less Patient Parents B": if they answered only A or only B.
- "More Patient Parents B": If they answered only C or only D.

This measure of patience is not correlated with treatment status, as presented in table A.6.4.4 below.

Table A.6.4.4 T-test for more/less patient B by treatment status

Variable	Survey 2 Sample	Treatment	Control	Difference	p
More Patient B (%)	0.482	0.492	0.472	0.019	0.836

Table A.6.4.5 shows the results of estimating the effect of treatment on reading time for the different groups of patient/impatient parents. The effect of the treatment is much stronger for the less patient parents, independent of whether we use measure A or B.

Table A.6.4.5 Time preferences and treatment effects. Dependent variable: Reading time

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Baseline: All PACT Parents	Took Survey 2	With Time Preferences A	Less Patient Parents A	More Patient Parents A	With Time Preferences B	Less Patient Parents B	More Patient Parents B
Treatment	88.32***	82.12***	80.33***	139.97***	16.44	82.12***	124.52***	42.26
	(18.79)	(24.08)	(30.30)	(39.73)	(41.81)	(24.08)	(33.25)	(33.95)
Constant	63.34***	83.61***	91.78***	75.36***	105.96***	83.61***	68.33***	97.26***
	(9.49)	(14.11)	(17.62)	(14.19)	(30.58)	(14.11)	(12.57)	(24.19)
SD Control Group	87.48	102.76	112.88	62.03	143.25	102.76	62.95	128.08
Effect Size	1.01	.80	.71	2.26	.11	.80	1.98	.33
Observations	169	112	84	42	42	112	54	58

Notes: Robust standard errors in parentheses. Significance levels: * $p<0.10$, ** $p<0.05$, *** $p<0.01$. With Time Preferences A: excludes parents without variation in the time orientation task answers. Impatient (patient) parents A are those whose score on the time orientation task is below (above) the median. With Time Preferences B: includes parents as patient if they answered always 100% or 66% of the budget sooner. Impatient (patient) parents A are those whose score on the time orientation task is below (above) the median. SD Control Group is the standard deviation of the control group for the respective dependent variable. The effect size is the ratio of the coefficient for the treatment group to the standard deviation of the control group.

A final test consists in dropping parents that are systematically being inconsistent when making their choices. A choice is classified as consistent if it allocates the same or a larger budget share to the future payment date as a previous choice with a lower gross rate. As the gross rate increases, the law of demand dictates a weakly decreasing allocation to the earlier time point.

The number of inconsistent choices at the parent level by treatment status is given by:

Number of Inconsistent choices	Group		Total
	Treatment	Control	
0	34	27	61
1	8	9	17
2	7	6	13
3	4	4	8
4	3	4	7
5	3	3	6
Total	59	53	112

We classified a parent to be systematically consistent if the number of inconsistent choices is less or equal to three. This is arbitrary, but the results hold for any other cutoff. Table A.6.4.6 shows that the results hold if we consider the consistent parents only.

Table A.6.4.6 Time preferences and treatment effects for consistent parents. Dependent variable: Reading time

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Baseline: All PACT Parents	Took Survey 2 & Consistent	With Time Preferences A, & Consistent	Less patient Parents A & Consistent	More Patient Parents A & Consistent	With Time Preferences B & Consistent	Less Patient B & Consistent	More Patient B & Consistent
Treatment	88.32***	81.74***	79.66**	136.03***	21.55	81.74***	121.33***	46.87
	(18.79)	(26.42)	(34.44)	(45.32)	(46.39)	(26.42)	(36.86)	(36.35)
Constant	63.34***	90.17***	102.33***	85.13***	114.37***	90.17***	73.41***	103.06***
	(9.49)	(15.93)	(20.66)	(17.76)	(33.09)	(15.93)	(15.04)	(25.70)
SD Control Group	87.48	108.14	120.56	66.89	147.68	108.14	67.48	131.11
Effect Size	1.01	.76	.66	2.03	.15	.76	1.8	.36
Observations	169	99	71	34	37	99	46	53

Notes: Robust standard errors in parentheses. Significance levels: * p<0.10, ** p<0.05, *** p<0.01. With Time Preferences A: excludes parents without variation in the time orientation task answers. Impatient (patient) parents A are those whose score on the time orientation task is below (above) the median. With Time Preferences B: includes parents as patient if they answered always 100% or 66% of the budget sooner. Impatient (patient) parents A are those whose score on the time orientation task is below (above) the median. SD Control Group is the standard deviation of the control group for the respective dependent variable. The effect size is the ratio of the coefficient for the treatment group to the standard deviation of the control group.

A.7 Goal Setting and Imputation

Parents in the treatment group were asked to set a goal each week for how much time they would spend reading to their child during the next week. As noted above we included the goal-setting component of the intervention because commitment devices have been shown to change behavior in domains other than parenting. Setting a goal for doing a particular behavior raises the psychological cost of not doing the behavior. Anecdotally we know that parents in PACT were focused on the goals that they set. They would often tell members of the research team that they were sorry that they did not meet

their goal and they would express determination to meet the goal. But if not meeting the goal was psychologically costly, then we expect that over the six weeks of the intervention the difference between the goal and the actual amount of reading time would decline.

Parents were asked to set a goal when they first received the tablets so for the first week all 84 parents in the treatment group set a goal. Parents were then asked to set a goal at each weekly check-in when they dropped off and picked up their tablet at the preschool. If a parent did not bring the tablet in or did not pick it up, we asked the parent to set a goal by text message. However, for a variety of reasons not all parents set a goal every week. By week 2 only 63 parents set a goal, by week three the number was 58 and then for the remaining weeks about 50 parents set a goal. Over the six week intervention about 70 percent of parents set a goal for 3 or more of the 6 weeks and about 23 percent set a goal for all six weeks. We assigned the goal of the previous week to the parent that did not set a goal for the following week. If parents missed setting a goal for 2 weeks they are still counted as missing. The assumption here is that parents did not change their goals much over successive weeks. We test this by subtracting the lowest goal from the highest goal for each parent. When we do this we find that about 40% of the parents change their goal by 30 minutes or less, and 60% changed it by an hour or less. After this imputation the number of people reporting a goal declined from 84 in week 1 to 60 in week six.

To look at the difference between the goal and the actual amount of reading we need not only the parents' goal but also the actual amount of reading time. Not all parents brought their tablet in every week so we do not have a weekly reading amount for all parents. But while only 16.5 percent of parents checked in every one of the six weeks, 70 percent checked in for at least 4 of the six weeks. When a parent did not check in for 2 weeks we averaged the total number of minutes at the end of the second week over the previous two weeks. If a parent does not check in for 3 weeks we average the reading time over those three weeks and so on so that everyone who participated in PACT has a reading score for every week.

Using these imputed goals and reading time, we find that the difference between the reading goal and the actual reading time was 102 minutes for week 1. The difference then dropped for the next 2 weeks to 81 minutes and then 74 minutes. Then for the final three weeks the difference remained between 63 and 64 minutes. This suggests that while parents did set more achievable goals, the goals were still set much too optimistically; even in the last week the average goal was three times the average actual amount of time the parent spent reading to the child.

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