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THE EFFECT OF EARLY EDUCATION ON SOCIAL PREFERENCES

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ABSTRACT

We present results from the first study to examine the causal impact of early childhood education on social preferences of children. We compare children who, at 3-4 years old, were randomized into either a full-time preschool, a parenting program with incentives, or to a control group. We returned to the same children when they reached 7-8 years old and conducted a series of incentivized experiments to elicit their social preferences. We find that early childhood education has a strong causal impact on social preferences several years after the intervention: attending preschool makes children more egalitarian in their fairness view and the parenting program enhances the importance children place on efficiency relative to fairness. Our findings highlight the importance of taking a broad perspective when designing and evaluating early childhood educational programs, and provide evidence of how differences in institutional exposure may contribute to explaining heterogeneity in social preferences in society.

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1 Introduction

Early childhood education has become a touchstone issue in the world of public education. In the past, randomized control trials such as the High/Scope Perry Preschool project (Schweinhart et al., 1993; Schweinhart, Montie, Xiang, Barnett, Belfield and Nores, 2005; Heckman, Moon, Pinto, Savelyev and Yavitz, 2010) and the Abecedarian Project (Campbell, Ramey, Pungello, Sparling and Miller-Johnson, 2002) have been used to measure the impact of early education on cognitive achievement and executive function skills (Heckman, 2000; Heckman, Stixrud, Urzua et al., 2006). Yet, the impact of early childhood education may extend well beyond human capital formation. Importantly, it might also shape individuals' moral views, including their social preferences.

At least since Adam Smith, social scientists have been aware that social preferences alter individual choices and potentially market outcomes. While scholars have more recently explored the social preferences that underlie social and political institutions (Fehr and Schmidt, 1999; Bolton and Ockenfels, 2000; Konow, 2000; Cappelen, Hole, Sørensen and Tungodden, 2007; Andreoni and Miller, 2002; Fisman, Kariv and Markovits, 2007), little is known about the causal processes shaping these preferences. Early childhood is a period of rapid social preference development and appears to be formative for an individual's social preferences in adulthood (Piaget, 1965; Kohlberg, 1984; Fehr, Bernhard and Rockenbach, 2008; Almås, Cappelen, Sørensen and Tungodden, 2010; Sutter and Kocher, 2007; Sutter, Feri, Kocher, Martinsson, Nordblom and Rützler, 2010; Harbaugh, Krause and Vesterlund, 2007; Bauer, Chytilová and Pertold-Gebicka, 2014; Ben-Ner, List, Putterman and Samek, 2015; Angerer, Glätzle-Rützler, Lergetporer and Sutter, 2015a).[1] It is therefore of great importance to understand the extent to which the social institutions faced in childhood, including early childhood education, influence the social preferences of individuals.

In this paper, we present results from the first study to examine the causal impact of early childhood education on social preference formation in children. We take advantage of a unique, large scale educational intervention and compare children who, at 3-4 years old, were randomized into either a full-time preschool, a parenting program or to a control group (Fryer, Levitt and List, 2015). The preschool and parenting program leverage two very different approaches to human capital formation. In the

[1] Related work has also explored the development of risk and time preferences of children (e.g., Bettinger and Slonim (2007); Castillo, Ferraro, Jordan and Petrie (2011); Sutter, Yilmaz and Oberauer (2015); Angerer, Lergetporer, Glätzle-Rützler and Sutter (2015b)) and competitiveness preferences (e.g., Gneezy and Rustichini (2004); Andersen, Ertac, Gneezy, List and Maximiano (2013); Samak (2013); Buser, Niederle and Oosterbeek (2014)).

former, children are touched directly by our program; while in the latter, children do not receive any education directly from us and the educational intervention is administered through the parents. In this way, our design is novel in that we explore how two different approaches to educational investment affect social preferences.

A further novelty of our design is that we measure the long run impacts of treatment, four years after the intervention. We returned to the same children when they reached 7-8 years old and conducted a series of incentivized experiments to elicit their social preferences. On the basis of these experiments, we can study both whether an early childhood intervention has a causal impact on individual preferences and whether the content of the intervention is important in and of itself.

We find that early childhood education has a strong causal impact on the social preferences of children several years after the intervention. In particular, we find that attending preschool makes children more egalitarian in their fairness view and that the parenting program enhances the importance children place on efficiency relative to fairness. Cultural transmission of social preferences, through preschool and the family, is a potential mechanism that explains these effects. Our findings highlight the importance of taking a broad perspective when designing and evaluating early childhood programs, and provide evidence of how differences in institutional exposure may contribute to explaining heterogeneity in social preferences in modern societies.

2 Experimental Design and Results

We study the behavior of children who took part in the Chicago Heights Early Childhood Center (CHECC) project, a unique, large-scale field experiment implemented in a prototypical low performing urban school district in Chicago Heights, Illinois (Fryer et al., 2015). In 2010-2012, children ages 3-4 years old were randomized into one of three groups:[2]

- **Preschool**: Included a free 9-month full day preschool for the child, but no direct intervention for the parents.

- **Parent Academy**: Included a 9-month incentivized parenting program for the parents to learn how to teach the child at home, but no direct intervention for the child. The parents in this program met for bi-monthly sessions and were

[2]Children participated in each of these programs for 1 to 2 years, depending on year and age at enrollment. Children who were 3 years old and enrolled in 2010 participated for 2 years, while the remaining children (those who were 4 years old at enrollment or those who enrolled in the second year of the program, 2011) participated for 1 year.

financially incentivized based on their participation in the program and on their child's performance on tests and evaluations.

- **Control**: The child and their parents did not receive any treatment interventions.

Children who participated in the Preschool treatment group received either the *Literacy Express* curriculum or the *Tools of the Mind* curriculum.[3] While the two curricula consist of different lesson plans and focus areas, both programs aim to promote social-emotional skills and incorporate small group interactions and partnered activities. The curriculum for the Parent Academy group was developed using concepts from *Literacy Express* and *Tools of the Mind*. However, unlike at the Preschool, children in Parent Academy neither attended school nor interacted with peers, and thus did not practice these skills through our program. Importantly, families that participated in the Parent Academy program could earn up to $3,400 per year based on their child's performance on various evaluations and assessments (Fryer et al., 2015).

We returned to these children in the spring of 2014, when they were in 1st-2nd grade, and conducted a series of incentivized social preference experiments. While we were unable to follow up with all children who participated in the CHECC program, we took advantage of a prior agreement with parents and with one of the school districts that participated in the study, which allowed us to conduct the experiments with the CHECC children enrolled in this school district during the school day. We identified 303 children who had participated in CHECC and were enrolled in one of the 9 elementary schools in the district at the time of the experiments. All of these children participated in our experiments.

Selection is not an issue under the assumption that families did not move in and out of district conditional on CHECC treatment assignment. This assumption is reasonable since families could still be part of the program even if they moved out of the district. Furthermore, the assumption is substantiated by examining the share of CHECC participants who remain in our sample, by treatment. Our sample captured 38.4% of the original Preschool group, 38.4% of the Parent Academy group and 34.7% of the Control group. Finally, as displayed in Table 1, children were balanced across treatment with respect to observable characteristics.

[Table 1 about here]

[3] Children were also randomly assigned to the curriculum. For more information about *Literacy Express*, see http://ies.ed.gov/ncee/wwc/interventionreport.aspx?sid=288. For more information about *Tools of the Mind*, see http://toolsofthemind.org. Since sample sizes are small, we do not split by curriculum in the analysis.

The children took part in four experiments, where they made decisions either as a stakeholder, distributing income between themselves and another child, or as a spectator, distributing income between two other children. We provide a simple social preference model to guide our analysis and the interpretation of the results. The model assumes that children make trade-offs among three primary motives that have been shown to be essential for understanding distributive choices: self-interest, fairness, and efficiency. We assume that children who act as stakeholders maximize the following utility function (adapted from Cappelen et al. (2007); Cappelen, Konow, Sørensen and Tungodden (2013)):

$$V(y_i) = y_i - \beta_i(y_i - m_i)^2 - \alpha_i(X_i - maxX_i)^2$$

where y_i is what the child allocates to herself, m_i is what the child considers fair to keep, X_i is the sum of resources distributed given the distributive decision, and $maxX_i$ is the maximal sum of resources that can be distributed if the child chooses the most efficient alternative. The weight attached to fairness relative to self-interest is captured by β_i, the weight attached fairness relative to efficiency is captured by β_i/α_i, and what the child views as fair is captured by m_i. Our framework thus allows heterogeneity in the weights attached to fairness relative to self-interest and efficiency and in fairness views. We assume that children maximize the same utility function when they act as spectators and distribute resources between two other children, with the following exceptions: for spectators, the first term (y_i) is always zero, and the second term (β_i) is defined for the spectator's preferences over the income of one of the two stakeholders in the pair, specifically the child with the lowest initial earnings. Hence, trivially, the interior solution for a spectator is to choose what he or she considers the fair allocation of the total earnings between the two stakeholders in the absence of efficiency concerns. If a child has to make a trade-off between fairness and efficiency in a spectator situation, then the decision will depend on the importance assigned to fairness relative to efficiency, (β_i/α_i).

In this model, early childhood interventions may shape the social preferences of the child in three ways: i) in the weight she attaches to fairness relative to self-interest (β_i) ii) in the weight she attaches to fairness relative to efficiency (β_i/α_i) and iii) in what she views as a fair distribution (m_i). By comparing the distributive decisions of the Preschool children and the Parent Academy children with the decisions of the Control children in our experiments, we can study how the early childhood education programs causally affected these fundamental dimensions of the children's social preferences.

The experiments were conducted one-on-one, always in the same order, with the experimenter reading the instructions aloud (see appendix for instructions). Table 2 summarizes the four experiments. Following the experiments, we distributed stickers that the participant allocated in the spectator decisions to non-participating children.

[Table 2 about here]

To study whether the early childhood programs affected the weight that the children placed on fairness relative to self-interest (β_i), we conducted a real-effort dictator experiment in which participants acted as stakeholders. Participants first completed a real-effort task in which they sorted pieces of white paper into one bin and pieces of colorful paper into another bin. Afterwards, participants were told that they and another anonymous child, who had completed the same task, together had earned ten coins, which they could exchange for small prizes. The coins were placed in a row in front of the participants and they were asked to decide how many coins they wanted to take for themselves (by putting them on the plate they were told was their own plate) and how many coins they wanted to give to the other child (by putting them on the plate they were told was the other child's plate).

To ensure that all participants made a distributive decision in the dictator experiment, the participants were asked to do the sorting task a second time and another child determined the distribution of earnings for this task. The fact that both children in a pair had completed the same task makes it reasonable to assume that they consider it fair to divide the earnings equally. The real-effort dictator experiment thus placed the child in a distributive situation in which she faced a trade-off between self-interest (taking everything for herself) or fairness (splitting the rewards equally).

In the remaining three experiments, participants acted as spectators, making distributive decisions for two other anonymous children, rather than for themselves. These were children who had not participated in the experiment. In the efficiency experiment (measuring β_i/α_i), participants made a spectator decision that had real consequences for two anonymous children, but not for themselves (Cappelen et al., 2013). Participants were asked to choose between two alternative allocations of stickers illustrated in a picture: one allocation gave two stickers to each child; the other allocation gave one sticker to one child and six stickers to the other child. We assume that the children viewed an unequal allocation of stickers between the two children as unfair in this situation, since neither of the children had any special claim to the stickers. The unequal distribution is, however, the efficient alternative, since it maximizes the total number of stickers received by the two children. The efficiency experiment thus placed the child

in a distributive situation in which she had to make a trade-off between efficiency and fairness.

In the dictator experiment and in the efficiency experiment, we assume that the children considered it fair to divide equally. It is well established, however, that people do not view all inequalities as unfair and that there is significant heterogeneity in whether people find inequalities due to merit or luck fair or unfair (Cappelen et al., 2007, 2013). To identify how the early childhood intervention shaped the children's fairness views (m_i), specifically their willingness to accept inequalities due to merit or luck, we conducted two spectator experiments that we refer to as 'merit' and the 'luck' experiments.

In both the merit and luck experiments, participants made decisions as a spectator in a real distributive situation in which two anonymous other children had unequal initial earnings of stickers. The experiments differed with respect to the source of the initial inequality in earnings. In the merit experiment, participants were informed that two other children had participated in a memory task and that one child did well and earned eight stickers, while the other child did not do so well and earned two stickers. Each child's earnings were indicated by placing the stickers the child had earned on the table below the plate that the spectator was told belonged to this child. The participant was then asked to determine the final allocation of stickers by moving the stickers from the table to either of the children's plates.

In the luck experiment, participants were presented with a situation in which the inequality was the result of luck rather than merit. The initial allocation of earnings between the two children was determined by the flip of a coin done by the experimenter in front of the participant. The 'lucky' child earned ten stickers while the 'unlucky' child earned no stickers. The earnings of the winner were indicated by placing ten stickers below the winner's plate. Again, the participants determined the final distribution of stickers by moving stickers from the table to either of the plates belonging to each child.

In the luck and merit experiments, we placed participants in distributive situations in which there were no self-interest or efficiency concerns. We thus assume that the participants implement what they view as a fair allocation, which means that their choices identify whether they consider inequalities due to merit or luck to be fair.

Results

Figure 1 provides a summary of the decisions made by the children in each of the four experiments. The average share given to the other child in the dictator treatment

was 42%, which is similar to what is found in previous dictator games conducted with children in this age group (Fehr et al., 2008; Engel, 2011). We observe a spike at the 50/50 distribution: 67% of the children chose to share exactly half of the coins, while only 7% of the children kept everything for themselves. Very few children gave more than half of the coins to the other child. In the efficiency treatment, we observe that 49% of the participants preferred the efficient, but unfair, allocation, while 51% of the participants chose the inefficient, but fair, allocation.

[Figure 1 about here]

In the two fairness view experiments, we observe spikes at the 50/50 allocation: 47% of the children in the merit experiment and 49% of the children in the luck experiment chose an equal distribution. The majority of the children, however, found it fair that one child received more stickers than the other child when their initial earnings differed. We also observe that very few children gave more stickers to the child with the lower initial earnings.

In the analysis of how the early childhood education programs affected distributive behavior, we focus on how much inequality the children implement in each of the experiments. We measure inequality by the absolute difference in the units, coins or stickers, received by the two children in the pair divided by the total number of units (which is equivalent to the Gini coefficient in the present distributive situations). Figure 2 summarizes across the 4 experiments how children in each of our treatment groups chose to allocate. In Table 3, we report ordinary least squares (OLS) regressions in which dummy variables for Preschool and Parent Academy are regressed on the inequality that children implement in each of the four experiments, with and without demographic controls. All regressions also control for the time of day and experimenter fixed effects (not reported). Taken together, insights from Figure 2 and the regressions reported in Table 3 lead to three main findings. First, from the upper-left panel of Figure 2, we observe that the early childhood education programs did not affect the selfishness of children. The inequality implemented in the dictator experiment by the children from the Preschool group and the Parent Academy group is very similar to the inequality implemented by the children in the Control group (p=0.793 for Preschool and p=0.516 for Parent Academy; all p-values reported come from the coefficient on the Preschool or Parent dummy variable in Table 3 regressions).

[Figure 2 about here]

[Table 3 about here]

The second main finding, shown in the upper-right panel of Figure 2, is that the children who took part in the Parent Academy program implemented 34% more inequality in the efficiency experiment than the Control children (p=0.024). The Parent Academy program thus caused children to place significantly more weight on efficiency relative to fairness in their distributive decisions. The Preschool children, on the other hand, are not statistically different from the Control group in how they made trade-offs between efficiency and fairness (p=0.635). Finally, the third main finding is shown in the lower two panels of Figure 2, which provides evidence of the Preschool group being more egalitarian in their fairness view than the children in the Control group. In the luck experiment, the Preschool children chose to implement 27% less inequality than the children in the Control group (p=0.023). In the merit experiment, the Preschool children implemented 15% less inequality than the children in the Control group (p=0.057). Examining the luck experiment and the merit experiment combined, we find that the Preschool children implemented 22% less inequality than the Control group children (p=0.014). In contrast, we do not find any evidence of the Parent Academy affecting the children's fairness view. The Parent Academy children implemented slightly less inequality in the luck experiment and slightly more inequality in the merit experiment than the children in the Control group, but these differences are not statistically significant (p=0.352 in the luck experiment, p=0.649 in the merit experiment, and p=0.692 for the average in the luck and the merit experiment).

3 Discussion

Our results provide evidence of early childhood education having a strong causal impact on social preferences several years after the children took part in the programs. We also find that the content of the childhood intervention is of great import: the Parent Academy makes children more efficiency oriented, while the Preschool makes children more egalitarian. By showing that early experiences matter for preferences, these results are consistent with recent important work on the cultural transmission of preferences through learning and other forms of social interaction (Bisin and Verdier, 2010).

We propose that a potential mechanism for the impact of Preschool is that conflicts at school are resolved by teachers through an egalitarian fairness norm, which is then transmitted to and internalized by the children in the Preschool group. The Parent Academy may have affected the interaction in the family by introducing an efficiency argument for giving priority to the child who was part of the program. If the parents

justified an unequal allocation of parental resources among the children by appealing to efficiency considerations, this reasoning might be transmitted to and internalized by the children in the Parent Academy group. Indeed, in a related paper, we show that the Parent Academy induces parents to respond to short term cash incentives by moving scarce resources from one child to another based on efficiency (Chuan, List and Samek, 2016).

Our results also contribute to a better understanding of how social preferences develop in childhood and shed light on a possible explanation for the observed heterogeneity in social preferences, by showing that differences in institutional exposure can result in lasting differences in social preferences. Previous work has documented that there are significant changes in social preferences throughout childhood (e.g., Fehr et al. (2008); Almås et al. (2010); Fehr, Glätzle-Rützler and Sutter (2013); Pamela, Miguel and Velde (2015)). We complement this literature by showing that educational institutions play an important role in shaping social preferences at a young age, which suggests that institutions in society are important for shaping the social development of children.

This insight is important for at least two reasons. First, it cautions us that we should take into account the effect that institutions have on preferences when we evaluate their consequences. Second, it means that institutions can be used strategically to shape people's preferences. Cantoni, Chen, Yang, Yuchtman and Zhang (2014) have highlighted the importance of curricula by showing that changes to curricula in Chinese schools led to changed views on political participation and democracy in China. Our results also complement results from experiments conducted concurrently (Kosse, Deckers, Schildberg-Hörisch and Falk, n.d.), which show that random assignment to an early childhood mentoring program has a causal effect on children's level of pro-sociality. Importantly, our results contribute to the research on how education influences human capital formation (Becker, 2009). The literature on human capital formation has increasingly emphasized the importance of taking a broader view of human capital formation, including the role of non-cognitive or 'soft skills' (Heckman, 2000; Heckman et al., 2006; Heckman, 2006). Our study highlights that early childhood education is crucial for the formation of social preferences. More research is needed to identify the causal mechanisms driving this relationship.

At a more specific level, we find that attending preschool makes children more egalitarian. This result is supported by recent work by Heckman and Raut (2016) that argues that the best way to reduce pre-tax inequality is to have universal preschool. Our results show that universal preschool will have an effect on willingness to redistribute,

and thus on post-tax inequality. Second, our results suggest that early childhood interventions might affect the dynamics in the family (Kalil and Meyer, 2015). Both of these areas represent fruitful avenues for future research.

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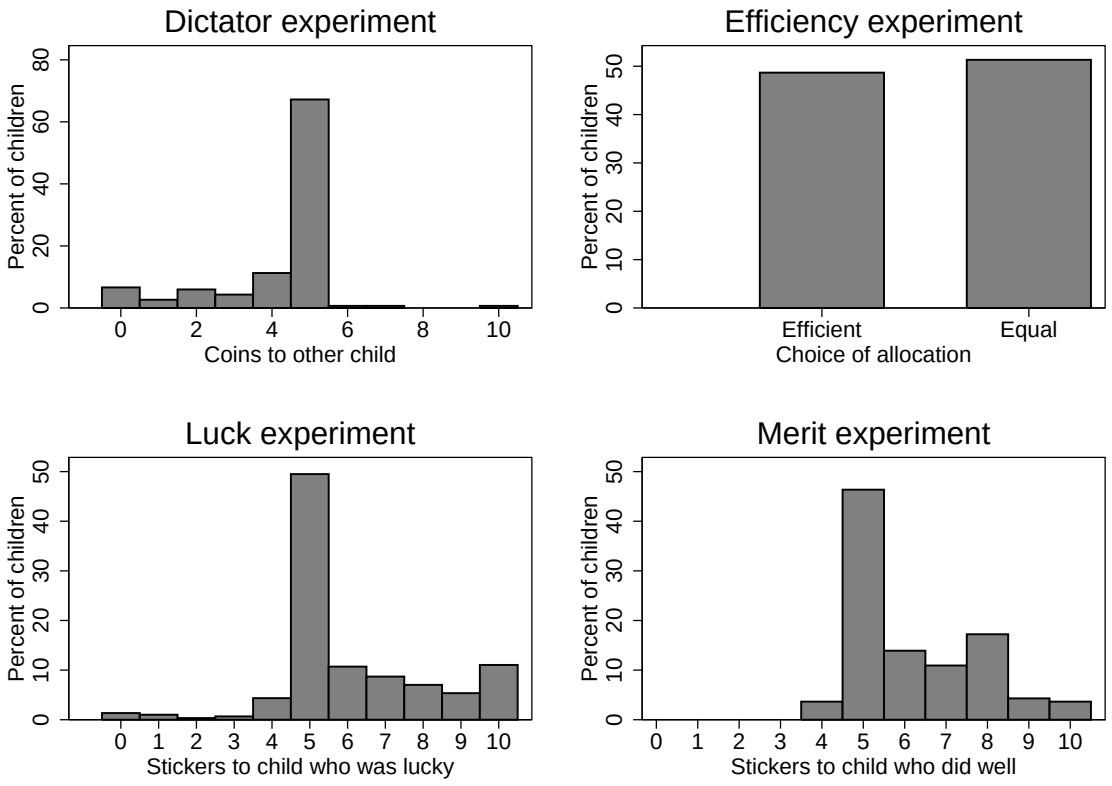

Figure 1: Overview of decisions

Note: The figure shows histograms of the choices made by the children in each of the four experiments.

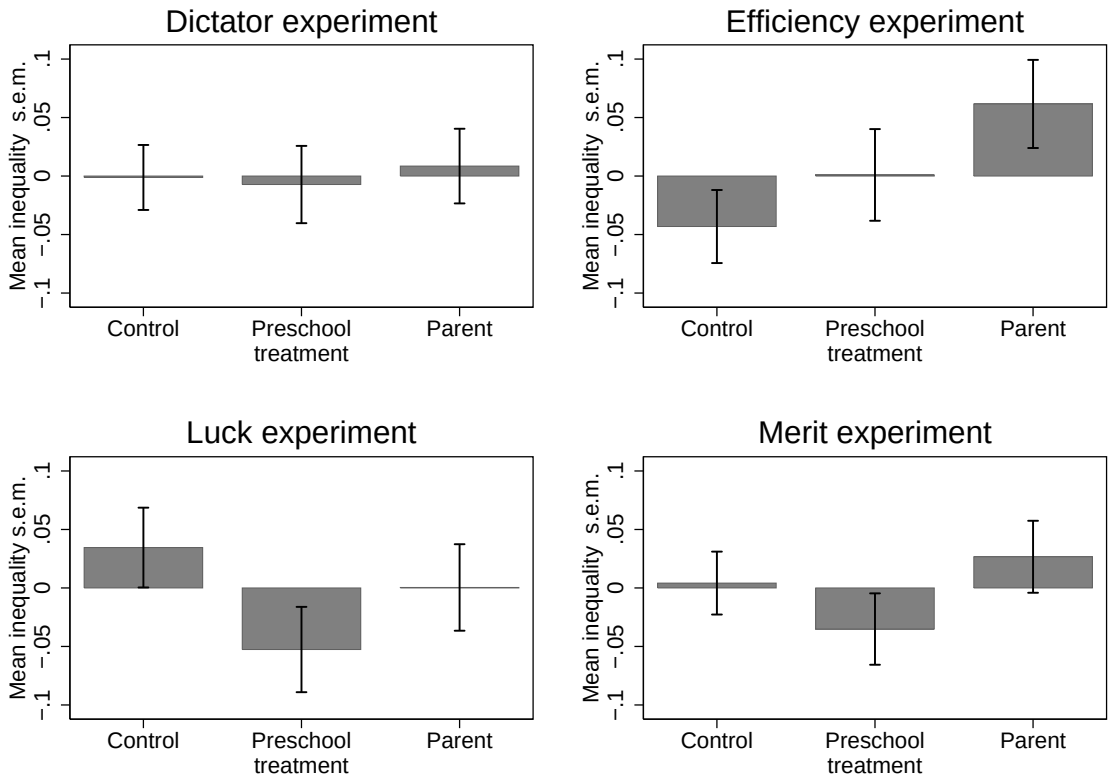

Figure 2: Effect of early education

Note: The figure shows for the Control group, the Preschool group and the Parent Academy group, how the mean inequality chosen by children in that group differs from the mean inequality chosen by all participants. Inequality is calculated as the absolute difference in the units, coins or stickers, received by the children divided by the total number of units. This number is zero if the child chose an equal distribution and one if the child gives everything to one of the children. The standard error of the mean is indicated.

Table 1: Balance Table

	Control	Parent	Preschool	Total	F-test
Age	7.552	7.571	7.645	7.588	0.491
	(0.0603)	(0.0640)	(0.0663)	(0.0366)	
Female	0.440	0.462	0.524	0.474	0.640
	(0.0523)	(0.0568)	(0.0555)	(0.0316)	
Black	0.154	0.179	0.244	0.191	0.395
	(0.0380)	(0.0437)	(0.0477)	(0.0249)	
Hispanic	0.780	0.795	0.695	0.757	0.256
	(0.0436)	(0.0460)	(0.0512)	(0.0271)	
White	0.0659	0.0256	0.0610	0.0518	0.724
	(0.0262)	(0.0180)	(0.0266)	(0.0140)	
Time of day	9.780	10.23	9.890	9.956	0.672
	(0.251)	(0.192)	(0.203)	(0.128)	
Observations	130	89	84	303	

Note: The table reports the background characteristics of the participants in the three groups and for all participants. "Age" is the average age in years; "Female" is the share of girls; "Black", "Hispanic" and "White" is the share of children belonging to each of these races; and "Time of day" is the average time of day when the child took part in the experiment using a 24-hour clock. The p-value reported in the last column is from an F-test of joint significance.

Table 2: Experimental Design

Experiment	**Type**	**Description**
Dictator	Stakeholder	Allocate coins between self and another child.
Efficiency	Spectator	Choose between an unfair and efficient allocation or a fair and inefficient allocation.
Merit	Spectator	Allocate stickers between a child who did well and a child who did not do well.
Luck	Spectator	Allocate stickers between a lucky child and an unlucky child.

Note: The table provides an overview of the four experiments the children took part in. In the stakeholder experiment, the participants made a decision that affected their own payoff as well as the payoff of another child. In the spectator experiments, the participants made decisions that affected the payoff of two other children. The experiments were conducted in the following order for all subjects: Dictator, Merit, Luck and Efficiency.

Table 3: Regressions

	Dictator	Dictator	Efficiency	Efficiency	Luck	Luck	Merit	Merit	Merit+Luck	Merit+Luck
PK Dummy	0.012	0.018	0.026	0.020	-0.12**	-0.11**	-0.082*	-0.080*	-0.10**	-0.098**
	(0.045)	(0.046)	(0.054)	(0.054)	(0.054)	(0.054)	(0.043)	(0.043)	(0.042)	(0.042)
PA Dummy	0.029	0.030	0.12**	0.12**	-0.050	-0.043	0.019	0.016	-0.016	-0.014
	(0.044)	(0.044)	(0.053)	(0.052)	(0.054)	(0.053)	(0.042)	(0.042)	(0.041)	(0.041)
Age (Months)		-0.051		-0.13*		-0.22***		-0.067		-0.14**
		(0.066)		(0.077)		(0.078)		(0.062)		(0.061)
Female Dummy		0.019		0.064		0.016		0.066*		0.043
		(0.038)		(0.044)		(0.045)		(0.035)		(0.035)
Black Dummy		0.14		0.24**		-0.067		0.030		-0.018
		(0.10)		(0.12)		(0.12)		(0.095)		(0.093)
Hispanic Dummy		0.11		0.17		-0.089		0.039		-0.026
		(0.093)		(0.11)		(0.11)		(0.088)		(0.085)
Constant	0.18***	0.57*	0.26***	0.38	0.35***	1.33***	0.23***	0.53*	0.29***	0.94***
	(0.055)	(0.31)	(0.065)	(0.37)	(0.066)	(0.37)	(0.052)	(0.29)	(0.051)	(0.29)
Observations	302	302	302	302	299	299	302	302	298	298
R^2	0.023	0.046	0.050	0.087	0.061	0.105	0.053	0.076	0.065	0.104

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: The table reports ordinary least squares (OLS) regressions of a participant's chosen level of inequality in the four games and for the merit and luck game combined. "Preschool" is an indicator variable taking the value one if the child was in the Preschool group and "Parent Academy" is an indicator variable taking the value one if the child was in the Parent Academy group. "Age" is the child's average age in years; "Female" is a dummy for the child being a girl; "Black" and "Hispanic" are dummies for the child being Black or Hispanic respectively. Included, but not reported, are controls for the time of day when the child took part in the experiment and experimenter fixed effects. Even though 303 children participated in the experiment, since each game was voluntary, some children did not complete all of the games. 1 child did not complete the Merit game, 4 children did not complete the Luck game, 1 child did not complete the Dictator game and 1 child did not complete the Efficiency game. Standard errors in parentheses.