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THE POWER OF PRESCHOOL:
EFFECTS OF A PRESCHOOL AND CASH TRANSFER PROGRAM ON CHILDREN'S MENTAL HEALTH IN UGANDA

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ABSTRACT

This paper evaluates the impact of a preschool and cash transfer program in Uganda on children's mental health and further examines whether the female caregiver's role in the household influences the treatment effect. Poverty and lack of stimulation imposes great risks on children's mental health and financial restrictions is one of the main reasons why parents did not send their child to preschool. Evidence suggests that both the preschool and cash transfer treatments improve children's mental health in the case when the female primary caregiver is the head of the household and mostly takes care of the child alone.

Keywords: preschool, cash transfers, child mental health, randomized control trial, women

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1. INTRODUCTION

Mental health is important to global health (Patel 2014) and should be included as a key global priority in order to achieve sustainable development (Tsutsumi, Izutsu, and Ito 2015). The past decades have seen increased documentation of the negative cyclical interaction between poverty and mental health problems in low- and middle-income countries (LMIC) (Lund, et al. 2011). The risk of mental illness increases among people living in poverty, and living with a mental illness increases the odds of drifting into or remaining in poverty. Children who grow up in poverty are exposed to greater levels of stress, and the length of time spent in poverty is associated with increased feelings of unhappiness and anxiety (McLeod and Shanahan 1993). Mental disorders affect as many as 20% of children and adolescents globally, with half of all illnesses starting before the age of 14 (World Health Organization 2019). Sound mental health is important to healthy child development, and vice versa, and children in LMIC are particularly exposed to adverse development conditions. Poverty and lack of stimulation negatively affect children's cognitive, motor, and social-emotional development and impose a great risk on children's mental health every day (Grantham-McGregor, et al. 2007).

This paper presents the results of a field experiment in rural/peri-urban Uganda offering free preschool, cash transfers, or a combination of both to female primary caregivers of children age three to five. The experimental design aims at investigating the effect of the treatments on children's mental health. All treatments are expected to increase school enrollment, and consequently improve children's mental health. Early childhood education interventions have been described as an important preventative action to enhance cognitive and social-emotional development to support sound mental health in young children (O'Connell, Boat, and Warner 2009). The assessment of child mental health is done using the Strengths and Difficulties Questionnaire measuring children's behavioral problems, one year after the intervention started.

Brain development is highly affected by experiences in early childhood; affecting health, behavior, learning, and life opportunities (Robinson, et al. 2017). The most common disorders between the age of four to six are disruptive, behavioral and emotional disorders (World Health Organization 2005). Children under five years are rarely diagnosed with a disorder, however, specific symptoms may indicate the development of mental health problems later in childhood (Kieling, et al. 2011). Signs of anxiety disorders, attention-deficit/hyperactivity disorder, conduct disorder, and depression can be seen in children at a very young age (Center on the Developing Child at Harvard University 2015). Rapid mood swings and temper tantrums are common in children throughout the toddler years, but as children grow out of the "terrible twos" and enter into the preschool years they become more independent and start developing stronger self-awareness and understanding of their own and others' feelings. Peer relationships and play activities have been highlighted as essential elements in children's social and emotional development (Ginsburg 2007). In fact, play is so important to children's wellbeing that it was included in the United Nations Convention on the Rights of the Child in 1989 (UN General Assembly 1989). It is important to remember that children develop differently and that they could just be going through a stage of temporary behavioral problems. It is therefore critical to study the prevalence of their behavior problems over time before drawing any conclusions.

Children's behavior problems are often described as internalizing or externalizing. Internalizing behavior problems are characterized by emotions directed inwards e.g. fearful, inhibited, anxious, shy, worried, somatic; while externalizing behavior problems are characterized by emotions directed outwards e.g. aggressive, hostile, antisocial, temperamental, lying, stealing (Achenbach and Edelbrock 1978). Research tools for assessing children's mental health problems often use categorizations to study multiple dimensions of children's psychological attributes. The Strengths and Difficulties questionnaire (SDQ) is a brief behavioral screening instrument that applies this method and has been implemented worldwide.

The paper examines the intent-to-treat estimates of the program and then carries out a heterogeneity analysis focusing on the role of the respondent within the household. The head of the household is the person in the house that has the main responsibility for making decisions and earning money. In 75% of cases when the respondent is the head she is unmarried, and the child's father is not present. In 62% of cases she is also a single caregiver, meaning there are no other adults in the household, thereby leaving her with full responsibility for the children.

The results show an increase in school enrollment for the preschool, cash transfer and combined treatments by 15%, 8% and 14%, respectively. Full-day enrollment increased more for the preschool and combined treatments: 50% and 51%; than for the cash transfer treatment: 8%. Overall, the treatments had little effect on children's mental health. However, a decreasing effect on mental health problems was found for children in households where the respondent is head. Most effective was the preschool treatment which reduced total problems by 0.29 standard deviations and externalizing problems by 0.30 standard deviations. The cash transfer treatment also gave a reduction in externalizing problems by 0.32 standard deviations, while no positive effects were seen for the combined treatment when the respondent is head.

When the respondent was not head, on the other hand, these positive effects disappeared, and we even observed some negative effects on children's mental health problems. Internalizing problems increased by 0.15 standard deviations for the cash transfer treatment and emotional problems increased by 0.15 standard deviations for the combined treatment. These results suggest that certain characteristics of the female caregiver in the household receiving the treatment influences the effect on the child's mental health. Respondent heads are often more prone to multitasking work with child care and the child might, therefore, benefit more from a preschool environment. Increased stimulation and play seem to be the main drivers behind the positive effects seen for respondent heads, while separation anxiety and domestic violence seem to be the main reasons for the negative effects seen for non-head respondents.

2. LITERATURE REVIEW

This work project contributes to the growing literature on child mental health in LMIC. Although 80% of people likely to experience a mental disorder and 90% of the world's population of children under the age of 15 live in LMIC, only about 10% of RCT's on child and adolescent mental health come from these countries (Mnookin 2016) (Kieling, et al. 2011). Thus, an important concern arises seeing as mental health efforts in LMIC are often based primarily on evidence from high-income countries (HIC). Research on child mental health in LMIC is increasing, however, more studies are still needed to map out the prevalence, identify important risk factors, and get a better understanding of which interventions are successful in preventing and treating these conditions. Few studies have previously examined the short-term effects of preschool and cash transfers on children's mental health. This paper is therefore an important contribution to the small existing literature on child mental health in LMIC.

The effect of exposure to a subsidized child care program in Colombia showed improved social-emotional skills for children older than three years after at least 15 months of program exposure (Bernal and Fernández 2013). Another program in Bolivia providing day care, nutritional, and educational services showed a positive effect on the psychosocial behavior of children between six months and six years who participated in the program for at least seven months (Behrman, Cheng, and Todd 2004). Both the Colombian and Bolivian studies showed larger benefits for younger children and children who were exposed to the program longer. Another preschool program for children between 4.5 to 6.5 years in rural Bangladesh found that children in the program performed better on some indicators of social development during play (Aboud 2006). In a rural setting in Mozambique, much similar to the Ugandan field experiment, a randomized evaluation of a preschool intervention found a positive effect on children's social-emotional and behavioral outcomes two years after the intervention (Martinez,

Naudeau and, Pereira 2012). This evidence supports the use of early childhood education interventions to improve children's mental health problems, starting as early as possible.

Positive effects on child mental health from the cash transfer treatment can also be expected through increased school enrollment, similarly to the preschool intervention. A systematic review of the relative effectiveness of conditional and unconditional cash transfers on school enrollment in LMIC suggests that both UCT's and CCT's have a significant effect on school enrollment. UCT's increase the likelihood of being enrolled by 23% and CCT's by 41% (Baird, et al. 2013). A UCT program in rural Ecuador found a significant increase in school enrollment and a small reduction in behavioral problems (for the poorest quartile) for children age three to seven after 17 months of program exposure (Schady and Paxson 2010).

It should be mentioned that the positive effects on children's mental health could also result from other outcomes of the programs such as improved mental health of the mother. Mental health problems in mothers are a risk factor for poor parenting, and consequently poor child development and mental health (Hadley, et al. 2008) (Mensah and Kiernan 2010). Mexico's CCT program "Oportunidades" was associated with a 10% reduction in depressive symptoms of mothers due to alleviation of poverty (E. J. Ozer, et al. 2011), and a 10% decrease in aggressive/oppositional symptoms in children age four to six (E. J. Ozer, et al. 2009).

3. UGANDA CONTEXT

Uganda is a landlocked country located north of the Victoria Lake in East-Central Africa. Its population is around 43 million whereof 47% are under the age of 15. Using an indicator of multidimensional poverty, the Uganda National Household Survey 2016/17 (2018) found that more than 56% of children experience multidimensional deprivations and low standard of living. In Uganda, 37% of children age three to five are enrolled in preschool education. Higher enrollment is expected for age four to five (47%) than for age three to four (22%). Enrollment is also higher for children of mothers with more than secondary education (80%), who are in

the highest wealth quintile (66%), and who are living in urban areas (55%) (Uganda Bureau of Statistics & ICF 2018). Financial reasons are reported at 62% as the main reason why parents did not send their child to preschool (Weatherholt, et al. 2018). There is not a lot of data on the prevalence of mental health problems in Uganda seeing as little research has been done on the topic. However, one study on the prevalence of child mental health problems in Sub-Saharan Africa found that one in seven children and adolescents have significant difficulties, with one in ten having a specific psychiatric disorder (Cortina, et al. 2012).

4. EXPERIMENTAL DESIGN AND DATA COLLECTION

4.1. Design:

The field experiment in Uganda is designed as a randomized control trial involving two interventions organized into three treatment arms and one control group. A total of 1496 households with preschool-age children were targeted for the intervention. The preschool intervention (PS) offers a subsidy to cover school fees for the child to attend a whole year (three terms) of full-day preschool. The cash transfer intervention (CT) is equivalent to the average value of school fees in the preschool intervention (based on nearby villages) and is paid in three installments corresponding to the beginning of each school term. The preschool and cash transfer interventions are thereby made as identical as possible in timing and value. The third treatment (PC) is a combined intervention that offers both preschool and cash transfers. Lastly, there is the control group (C) that receives neither preschool nor cash transfers.

4.2. Sampling and randomization:

Nine districts in the East (Jinja, Iganga and Mbale), West (Kyenjojo, Kasese and Kabarole), and Central (Masaka, Mukono and Mityana) regions of Uganda were selected for the sampling (Appendix: Figure 1). The selected communities are categorized as rural and peri-urban, and typically have lower preschool enrollment compared to more urban areas. In order to be eligible for the intervention three household criteria had to be met: (i) the female caregiver

is present within the household (e.g. mother or grandmother), (ii) the household has one (and only one) child between three to five years, and (iii) the child is not already attending full-day preschool (allowed for children attending half-day). From these, 1496 households in 400 villages were randomly selected to participate in the baseline survey and the intervention.

The randomization and implementation phase took place in January and February 2019 at the individual level. Stratified randomization was used to ensure balance across treatment groups with respect to district, target child being enrolled half day or not enrolled, the primary female caregiver being the mother or grandmother, target child having younger siblings or not, and the respondent being self-employed, employed or not employed. The households were then randomly assigned to one of the four treatment arms: (PS) those who receive free preschool (N=363), (CT) those who receive cash transfers (N=364), (PC) those who receive both free preschool and cash transfers (N=357), and (C) the control group who receives neither (N=412).

4.3. Data:

The main objective of the original field experiment is on business development and early childhood development. Specifically, the primary outcomes of interest are female primary caregivers' earnings and labor supply, as well as child development and preschool enrollment. This project, on the other hand, examines the effects of the intervention on children's mental health problems. The results presented were obtained from the inclusion of the Strengths and Difficulties Questionnaire in the project's midline survey, approximately one year after the intervention started. Results, analysis and discussion therefore applies only to this sub-project.

The baseline survey was conducted in November and December 2018. Data was collected on various household demographics with the survey respondent being the primary female caregiver of the targeted child. Table 1 gives an overview of some baseline characteristics of the sample of households. According to the UDHS 2016 Christianity is the largest religion in Uganda and the main faith of around 80% of the population, while Islam is

the second largest with close to 14%. This sample represents a smaller proportion of Christians and a larger proportion of Muslims compared to the country average. The mean household size in the study is 5.3 versus the UDHS 2016 country average of 4.5, which could be explained by urban versus rural variations, and the mean number of children is 3.2. Ownership of businesses is at 44% and ownership of land at 66%. Household heads account for 28% of respondents and 72% are married, however, only 62% have the father of the target child living in the household. The respondent is the mother of the target child in 89% of the cases and the grandmother in the remainder. The mean age of the target child is 4.06 years (48.71 months), with an equal share of male and female, and 36% of the children already enrolled in half-day preschool (similar to the UDHS 2016 estimates discussed in the Uganda context section).

TABLE 1: SUMMARY STATISTICS

Household	Mean	SD	Range	Respondent and target child	Mean	SD	Range
East region	0.40	0.49	0-1	Respondent is self-employed	0.44	0.50	0-1
West region	0.28	0.45	0-1	Respondent is employed	0.20	0.40	0-1
Central region	0.32	0.47	0-1	Respondent is unemployed	0.35	0.48	0-1
Christian	0.71	0.45	0-1	Respondent age	33.01	10.28	16-86
Muslim	0.27	0.44	0-1	Respondent is the head	0.28	0.45	0-1
Members	5.28	2.06	2-13	Respondent is married	0.72	0.45	0-1
Age 0-5	1.43	0.59	1-4	Respondent is the mother	0.89	0.31	0-1
Age 6-17	1.81	1.64	0-8	Respondent primary educ.	0.43	0.49	0-1
Own a business	0.44	0.50	0-1	Target child age (months)	48.71	8.79	36-71
Own land	0.66	0.47	0-1	Target child gender (female=1)	0.50	0.50	0-1
Father present	0.62	0.49	0-1	Target child enrolled half-day	0.36	0.48	0-1

In order to validate the experimental design, balance tests were performed for the households across the different treatment groups (Appendix: Table 1, Panel A). There were some pre-treatment differences between the groups, however relatively minor and few were significant, as is expected with random assignment to treatment. Significant differences were found for whether the respondent is married and whether the respondent has completed primary education, at the 10% level, with respect to the preschool group. Whether the respondent is a young mother (under 25 years) was significant at the 5% level for the cash transfer group, and the null hypothesis of joint no difference was rejected at the 10% level.

The SDQ was conducted in November and December 2019 after completion of the first school year. The SDQ had some attrition (7%) with 1388 households surveyed, out of 1496 at baseline. Attrition was 10% for the control group and 3% lower for each of the treatment groups, all significant at the 10% level. The F-statistic on the null hypothesis of joint no difference is not rejected. Adjustment for attrition is done using inverse probability weights (IPW) and the results hold[1]. Nevertheless, to ensure the sample is still balanced, balance tests were repeated for the SDQ sample (Appendix: Table 1, Panel B). The differences remain, however, the joint test of no difference is no longer rejected for being a young mother. Even so, variables with statistically significant differences are added as controls to all the regressions.

4.4. Outcome variable: child mental health

The measurement of child mental health is done using the Strengths and Difficulties Questionnaire (R. Goodman 2005). The SDQ is a brief behavioral screening instrument widely used to assess children's mental health problems (R. Goodman 1994). Since its introduction in the UK over two decades ago, the SDQ has been translated to approximately 80 languages and been administered in multiple countries worldwide. Consequently, the diversity of the hundreds of thousands of respondents from different groups and countries support the use of the SDQ as an assessment tool for multicultural research on child mental health (Achenbach, et al. 2008). The SDQ has also been employed in many African countries, including Uganda, however, most of the studies are related to child violence, HIV/AIDS, orphan hood, conflict, and war. The SDQ was designed to be applicable for children and adolescents age two to seventeen and is reported by the parents for the youngest children (R. Goodman 1997). This project used the age four to seventeen version of the questionnaire with reference to the child's behavior over the past six months, reported by the female primary caregiver.

[1] Adjusting for attrition using a probit model including strata variables, covariates used for balance tests, and a dummy variable indicating plans to migrate to estimate selection to treatment. Then predicting the conditional probability of treatment for each household in the sample, and generating the inverse probability weights: P(T=1|covariates) for treatment and 1-P(T=1|covariates) for control. Finally, re-estimating the outcome model adjusting for the inverse probability weights (Wooldridge 2002)

Children's mental health problems are estimated using the questionnaire's 20 items on problem behavior allocated into four subscales: emotional problems, peer problems, conduct problems and hyperactivity problems (Appendix: Figure 2). Added together these four dimensions generate a total problems score. Combining the scores of emotional problems and peer problems gives an internalizing problems score, while combining conduct problems and hyperactivity problems gives an externalizing problems score. This allows us to capture the two widely recognized dimensions of children's mental health problems as discussed in the introduction. It may be preferable to use the internalizing and externalizing subscales in community samples, whereas using the four separate subscales could be more valuable in high-risk samples (Goodman, Lamping, and Ploubidis 2010). Figure 1 gives an overview of the problem scores including keywords describing the five items within each subscale.

TOTAL PROBLEMS			
INTERNALIZING PROBLEMS		EXTERNALIZING PROBLEMS	
EMOTIONAL PROBLEMS	PEER PROBLEMS	CONDUCT PROBLEMS	HYPERACTIVITY PROBLEMS
SOMATIC WORRIES UNHAPPY CLINGY FEARS	SOLIDARITY POPULAR GOOD FRIEND BULLIED PREFERS ADULTS	TEMPERS FIGHTS OBEDIENT LIES STEALS	RESTLESS FIDGETY DISTRACTIBLE REFLECTIVE ATTENTIVE

Figure 1: SDQ subscales

Although the SDQ scores can be used as continuous variables, using a categorization can be convenient in getting an overview of the situation in the cohort. Set cut-points using a 3-band categorization have been defined based on a UK population-based survey considering 80% of children as normal, 10% as borderline, and 10% as abnormal. No similar norms or bandings exist for LMIC. Figure 2 illustrates the distribution of the scores for each subscale in the control group. The results are very much in line with the UK distribution but with slightly more children categorized as borderline and abnormal. Emotional problems with 37% of children categorized outside of the normal seem to be the biggest concern.

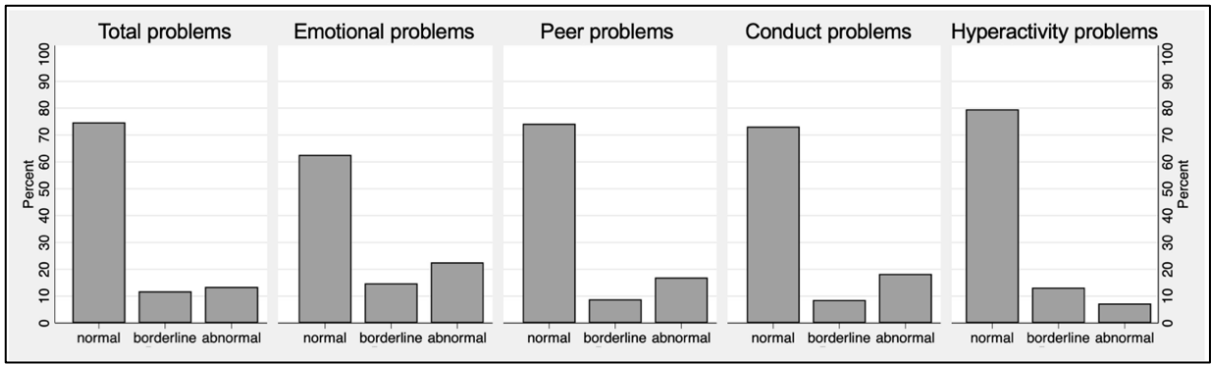

Figure 2: Control group SDQ score distribution

4.5. Estimation strategy:

Given the design of the experiment differences in SDQ scores between the control and treatment groups allows for estimation of the intent-to-treat effects. The aim of this paper is to estimate the treatment effects of giving preschool, cash transfers, or both to female primary caregivers on children's mental health problems; and whether the effects are different across treatments. Child mental health is estimated using the SDQ scores for emotional problems, peer problems, conduct problems and hyperactivity problems. To capture the two-dimensional effect on child mental health the scores are grouped into internalizing and externalizing problems. Total problems are estimated by combining all scores. The regression estimated is:

(Equation 1) $$y_i = \alpha + \beta_1 PS_i + \beta_2 CT_i + \beta_3 PC_i + X_i'\gamma + \varepsilon_i$$

where y_i is the outcome of mental health (SDQ score) for target child i. PS_i, CT_i and PC_i are dummy variables equal to 1 if the target child was in the treatment group and 0 otherwise, for preschool, cash transfer, and combined, respectively. X_i is a vector of baseline controls containing variables used for stratification and additional household demographics, including variables with significant differences prior to treatment. Controls are district, mother present, respondent's employment status, target child enrolled half-day, target child has younger siblings, respondent completed primary education, target child age, target child gender, respondent age, young mother (under 25 years), respondent is married, household size, and father lives in the household. The model is estimated using ordinary least square (OLS)

regression with robust standard errors, given randomization at the individual level. Two specifications are used: first with strata fixed effects only and second with additional controls.

In the next step, the analysis is expanded further by examining treatment effect heterogeneity by whether the respondent is head of the household or not. The following specification is used to examine the interaction between treatment and head status:

(Equation 2) $$y_i = \alpha + \beta' T_i' + \delta Head_i + \theta' T_i' * Head_i + X_i' \gamma + \varepsilon_i$$

where $\beta = [\beta_{PS} \ \beta_{CT} \ \beta_{PC}]$ is the vector of treatment effects for $T_i = [PS_i \ CT_i \ PC_i]$', a vector of dummy variables for preschool, cash transfer and combined equal to 1 for treatment and 0 otherwise. Head is a dummy variable equal to 1 for head and 0 for non-head. θ is a vector of the difference in treatment effects between head and non-head, i.e. the treatment effect heterogeneity. If both are significant β + θ gives the effect when the respondent is the head.

Interpretation of the results follows that lower scores mean less mental health problems and higher scores mean more mental health problems. To further simplify the interpretation of the results the SDQ scores have been standardized by subtracting the control mean and dividing by the standard deviation (z-scores). The coefficients in the regression outputs thereby indicate standard deviation changes in children's mental health problems within various dimensions.

5. RESULTS

5.1. School enrollment and respondent wellbeing

Before looking at the main outcomes an evaluation of program effects on school enrollment and respondent wellbeing is performed. The regression used is Equation 1 for full-day enrollment, but employing ANCOVA specifications including the baseline values of the dependent variables for enrollment, happiness, and stress. Table 2 displays the effect of the treatments on school enrollment and enrollment full-day. Enrollment increased in the control group from 37% at baseline to 82% after six months, making the difference small to the cash transfer group at 90%. The preschool and combined treatments increased enrollment to 97%

and 96%, respectively. All treatments gave a significant increase in school enrollment at the 1% level, however, significantly lower for the cash transfer group. The control and cash transfer groups had the highest enrollment in half-day: both at 49%, compared to preschool at 14%, and combined at 12%. The preschool and combined treatments offered to cover school fees for the child to attend full-day, but this is not always possible and could lead to some half-day enrollment. Full-day enrollment increased to 83% for the preschool group, 84% for combined, 41% for cash transfer and 33% for control. The increase in enrollment for the control group can partially be explained by examining enrollment rates by age. When children get older they are more likely to be enrolled in preschool, and some of the older children could even be enrolled in primary school (Uganda Bureau of Statistics & ICF 2018). At baseline 21% of children age three were enrolled, 45% of children age four, and 82% of children age five (Appendix: Table 2). Six months later the numbers were 79%, 82% and 92%, respectively. Considering the large increase in enrollment for the control group we might expect to see only smaller differences in children's mental health problems between treatment groups and control.

The treatments could also be expected to have an effect on the respondent's wellbeing.

TABLE 2: SCHOOL ENROLLMENT

	Enrolled	Full day
Preschool	0.1504***	0.4993***
	(0.0218)	(0.0312)
Cash transfer	0.0767***	0.0799**
	(0.0250)	(0.0346)
Combined	0.1421***	0.5148***
	(0.0222)	(0.0304)
Observations	1413	1413
R-squared	0.1048	0.2726
Control mean	0.8201	0.3280
F-stat: PS = CT	0.0001	0.0000
F-stat: PS = PC	0.5826	0.5933
F-stat: CT = PC	0.0008	0.0000
F-stat: PS=CT=PC=0	0.0000	0.0000
Strata FE	Yes	Yes
Controls	Yes	Yes
ANCOVA	Yes	No

TABLE 3: RESPONDENT WELLBEING

	Happiness	Stress
Preschool	0.4461**	-0.4344
	(0.2008)	(0.4222)
Cash transfer	0.8677***	-0.6122
	(0.2011)	(0.4147)
Combined	0.7062***	-0.5915
	(0.2015)	(0.4162)
Observations	1438	1438
R-squared	0.0915	0.1325
Control mean	3.9375	24.08
F-stat: PS = CT	0.0426	0.6748
F-stat: PS = PC	0.2136	0.7124
F-stat: CT = PC	0.4433	0.9696
F-stat: PS=CT=PC=0	0.0001	0.4194
Strata FE	Yes	Yes
Controls	Yes	Yes
ANCOVA	Yes	Yes

Note: Regressions are OLS and ANCOVA, using IPW to adjust for attrition. Dependent variables for Table 2 are enrollment rates. Dependent variables for Table 3 are happiness level 0-10, and stress level 0-40 (Cohen's perceived stress scale). All regressions include strata fixed effects: district, respondent is the mother, respondent employment status, target child enrolled, and target child has younger siblings; and additional controls: target child age, target child gender, respondent completed primary, respondent age, young mother, respondent married, household size, and father lives in household. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

After six months of program exposure, the mean level of happiness for respondents in the control group was 3.94 on a scale from 0-10 (Table 3). The happiness level for the preschool group was significantly higher at 4.45, the combined group at 4.66, and the cash transfer group at 4.82. A higher level of happiness of the respondent could be expected to positively affect the mental health of the child as well. The mean stress level at 24 is considered moderate, almost high. All treatment effects indicate lower levels of stress, however, none are significant.

5.2. Child mental health

Table 4 displays the main outcomes being the program effects on total, internalizing, and externalizing problems, one year after the intervention started. Neither the preschool treatment nor the combined treatment showed any significant effects. The coefficients are all low and none indicate a change of more than 0.1 standard deviations. The cash transfer treatment, however, had a significant harmful effect on internalizing problems giving an increase of 0.12 standard deviations. Having said that, the effect is relatively small and only significant at the 10% level when including controls. Also, it cannot be rejected that the effects were equal for the cash transfer and combined treatments. It might be the case that neither actually had an effect, or, there could also have been a small effect from the combined treatment.

TABLE 4: TREATMENT EFFECTS ON CHILD MENTAL HEALTH

Dependent	Total problems		Internalizing problems		Externalizing problems	
variable →	(1)	(2)	(3)	(4)	(5)	(6)
Preschool	0.0085	-0.0124	0.0153	-0.0030	-0.0007	-0.0188
	(0.0670)	(0.0668)	(0.0707)	(0.0705)	(0.0650)	(0.0647)
Cash transfer	0.0585	0.0678	0.1088	0.1159*	-0.0086	0.0005
	(0.0658)	(0.0657)	(0.0687)	(0.0691)	(0.0656)	(0.0651)
Combined	0.0325	0.0292	0.0921	0.0934	-0.0373	-0.0444
	(0.0676)	(0.0674)	(0.0706)	(0.0704)	(0.0672)	(0.0667)
Observations	1388	1388	1388	1388	1388	1388
R-squared	0.1514	0.1670	0.1167	0.1320	0.1507	0.1743
F-stat: PS=CT	0.4425	0.2150	0.1794	0.0858	0.9012	0.7593
F-stat: PS=PC	0.7203	0.5332	0.2840	0.1763	0.5751	0.6925
F-stat: CT=PC	0.6939	0.5604	0.8108	0.7492	0.6641	0.4948
F-stat: PS=CT=PC=0	0.8081	0.6088	0.2996	0.1874	0.9373	0.8946
Strata FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes	No	Yes

Note: All regressions are OLS, using IPW to adjust for attrition, and dependent variables are the SDQ scores. All regressions include strata fixed effects and additional controls (refer to the notes in Table 2). Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

5.3. Treatment effect heterogeneity

The analysis of the effects of offering preschool, cash transfers, or both on children's mental health is expanded further by examining treatment effect heterogeneity. It is likely that the causal effect of the treatments vary across subpopulations as the effects on children's mental health may differ depending on certain characteristics of the respondent in the household receiving the treatment. Therefore, attempting to ascertain any subpopulation where the treatment may be more effective, or more harmful, is an important next step.

Respondents who are household heads, the person in the house who is responsible for making decisions and earning money, makeup 28% of the sample. The main difference lies in the responsibility of being head. Single caregivers, meaning the respondent is the only adult in the household, account for 62% of respondents who are heads (Table 5). When the respondent is head and the father lives in the household it could be the case that he often goes away for work in a city nearby and thereby leaves the main responsibility for the household with the respondent. In the case when the respondent is not the head, 90% of the time she is living with her spouse or the father of the child, who is then in charge. In the remaining cases one of the respondent's parents is generally the head. When the respondent is head, balancing work and household chores with child care can be difficult, often resulting in multitasking. The alternatives for other caregivers are few, and particularly for a single caregiver this might just be an older sibling, a relative, or a neighbor. Consequently, the child might benefit more from stimulation and play in a preschool environment if the care provided at home is limited.

TABLE 5: DESCRIPTIVE STATISTICS: RESPONDENT HEAD AND NOT HEAD

Characteristics	Head	Not head	Characteristics	Head	Not head
Age	37.83	31.08	HH size	4.54	5.58
Single caregiver	0.62	0.01	HH children	2.95	3.23
Father lives in the household	0.11	0.82	Unemployed	0.20	0.41
Married living with spouse	0.11	0.88	Completed primary	0.35	0.42
Married not living with spouse	0.12	0.04	*Time use:*		
Separated/divorced	0.51	0.05	Hours working	6.36	5.15
Widowed	0.21	0.00	Hours with child	8.67	8.84
Never married	0.06	0.03	Hours on housework	3.02	3.59

TABLE 6: TREATMENT EFFECT HETEROGENEITY

	Panel A: Total problems + two problem dimensions		
Problems score	Total	Internalizing	Externalizing
Preschool	0.0688	0.0559	0.0641
	(0.0793)	(0.0845)	(0.0747)
Preschool * Head	-0.2949**	-0.2163	-0.2984**
	(0.1500)	(0.1560)	(0.1506)
Cash transfer	0.1421*	0.1491*	0.0978
	(0.0813)	(0.0853)	(0.0784)
Cash transfer * Head	-0.2477*	-0.1100	-0.3244**
	(0.1395)	(0.1481)	(0.1401)
Combined	0.0674	0.1270	-0.0115
	(0.0854)	(0.0850)	(0.0789)
Combined * Head	-0.1268	-0.1312	-0.1077
	(0.1505)	(0.1547)	(0.1496)
Observations	1388	1388	1388
R-squared	0.1701	0.1323	0.1788
Strata FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes
F-stat p-values			
Preschool=Preschool*Head=0	0.1417	0.3800	0.1391
Cash=Cash*Head=0	0.1425	0.2043	0.0688
Combined=Combined*Head=0	0.6337	0.3248	0.6329
Preschool+Preschool*Head=0	0.0745	0.2181	0.0729
Cash+Cash*Head=0	0.3475	0.7443	0.0514
Combined+Combined*Head=0	0.6375	0.9140	0.3454
Joint: Treated=0	0.3808	0.2750	0.4303
Joint: Treated*Head=0	0.1826	0.5874	0.0741
Joint: Treated=Treated*Head=0	0.4765	0.4534	0.3346

	Panel B: Four problem dimensions			
Problem score	Emotional	Peer	Conduct	Hyperactivity
Preschool	0.0353	0.0632	-0.0063	0.1068
	(0.0872)	(0.0789)	(0.0791)	(0.0781)
Preschool * Head	-0.0988	-0.2910**	-0.0361	-0.4385***
	(0.1656)	(0.1452)	(0.1545)	(0.1560)
Cash transfer	0.1356	0.1167	0.0632	0.0973
	(0.0877)	(0.0813)	(0.0830)	(0.0801)
Cash transfer * Head	-0.0880	-0.1011	-0.2526*	-0.2842*
	(0.1518)	(0.1505)	(0.1401)	(0.1483)
Combined	0.1541*	0.0516	-0.0442	0.0218
	(0.0884)	(0.0815)	(0.0787)	(0.0827)
Combined * Head	-0.1540	-0.0252	-0.0248	-0.1475
	(0.1602)	(0.1491)	(0.1521)	(0.1492)
Observations	1388	1388	1388	1388
R-squared	0.1068	0.1510	0.1358	0.1685
Strata FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
F-stat p-values				
Preschool=Preschool*Head=0	0.8326	0.1270	0.9465	0.0194
Cash=Cash*Head=0	0.2782	0.3538	0.1835	0.1563
Combined=Combined*Head=0	0.2187	0.8003	0.7386	0.5759
Preschool+Preschool*Head=0	0.6493	0.0620	0.7480	0.0142
Cash+Cash*Head=0	0.6971	0.9017	0.0937	0.1343
Combined+Combined*Head=0	0.9995	0.8328	0.5935	0.3079
Joint: Treated=0	0.2221	0.5549	0.5974	0.4321
Joint: Treated*Head=0	0.8118	0.1654	0.2218	0.0326
Joint: Treated=Treated*Head=0	0.6292	0.2485	0.6233	0.2280

Note: All regressions are OLS, using IPW to adjust for attrition, and dependent variables are the SDQ scores. All regressions include strata fixed effects and additional controls (refer to the notes in Table 2). Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Estimates of treatment effect heterogeneity by respondent head or not head are made using Equation 2. With the results presented in Table 6, the heterogeneity analysis starts by looking at the effects of the preschool treatment, by the respondent's head status. When the respondent is not head of the household, the preschool treatment gave no significant changes in any of the problem dimensions. When the respondent is head of the household, on the other hand, the situation seems a bit more optimistic suggesting an overall reduction in children's mental health problems. Specifically, the preschool treatment decreased total problems by 0.29 standard deviations, driven by a corresponding reduction in externalizing problems by 0.30 standard deviations (Panel A). Looking at the four problem dimensions separately (Panel B), these results are further supported by reductions in peer problems (0.29 standard deviations) and an even larger reduction in hyperactivity problems (0.44 standard deviations).

Moving on to the cash transfer treatment, we see a different pattern indicating more problems when the respondent is not head and fewer problems when the respondent is head. Similarly to the preschool treatment, the cash transfer treatment also shows a positive effect when the respondent is head, although not significant for total problems. We do, however, observe a significant decrease in externalizing problems by 0.32 standard deviations, supported by a reduction in conduct problems (0.25) and hyperactivity problems (0.28). When the respondent is not head we observe a significant increase in total problems by 0.14 standard deviations. Neither emotional problems nor peer problems show any significant effects separately but added together they contribute with a small rise in internalizing problems by 0.15 standard deviations. These results correspond to those found in Table 5 and suggest non-head respondents are the main driver behind the deteriorating effect on children's mental health.

Although not much effect on child mental health was seen from the preschool treatment overall (Table 4) it may still have an improving effect when the respondent is head. In addition, and contrary to the harmful effect seen when the respondent is not head, the cash transfer

treatment seems to have a beneficial effect in this case as well. Surprisingly perhaps, and despite the positive effects seen for both the preschool and cash transfer treatments, no positive effects are observed for the combined treatment. We do, however, see a small increase in emotional problems by 0.15 standard deviations when the respondent is not the head.

6. DISCUSSION

6.1. Overall lack of effect

A possible explanation for the overall lack of effect on children's mental health from sending them to preschool is the small differences found in school enrollment rates between the treatment groups and control (Table 2). The enrollment rates for the cash transfer treatment in particular were not very different from the control group, making it difficult to analyze the effects on children's mental health solely based on preschool enrollment. Nevertheless, we could still expect to see some differences between children in half-day and full-day enrollment. One mechanism of such effects could be that longer exposure to the preschool environment every day affects children's learning and development outcomes proportionally (Lee, et al. 2006). At the same time as the SDQ survey was implemented another survey was conducted on early childhood development, the IDELA (International Development and Early Learning Assessment). The IDELA tool measures children's development outcomes within four domains: motor development, emergent language and literacy, emergent numeracy/problem solving and social-emotional skills. Results from the survey (Appendix: Table 3) show that children in the preschool and combined treatment groups had significantly higher scores compared to those in the cash transfer and control groups. The IDELA generates percentage scores and the control mean score for total development was 52%. The preschool and combined treatments increased this score by approximately 3%, making the effects small but significant.

On another note, there are large variations in the quality of preschools in Uganda, and only 35% of teachers have some form of degree in preschool education (Appendix: Table 4).

School violence is also not unheard of and has been strongly linked with mental health difficulties of children in Ugandan primary schools (Thumann, Ula Nur, and Devries 2016). Positive effects from learning and play may have been cancelled out by negative effects related to poor school environments, proportionally for half-day and full-day enrollment. Although this could be an explanation for lack of effectiveness, it cannot be tested and is only speculation.

6.2. Treatment effect heterogeneity

6.2.1. Preschool treatment:

After one year of program exposure, children of female primary caregivers who were head of the household had fewer mental health problems, while no effects were seen on children of female caregivers who were not head of the household. The main takeaway is that preschool seems to have a positive effect on children's mental health when the alternative to child care at home is limited. Arguably, this is often the case when the respondent is head of the household. If the child is getting more attention and stimulation in preschool than it normally gets at home this could have a positive effect on their mental health. Having the child in full-day preschool will also free up time for the respondent to work more productively, leaving more quality time to spend with the child when it comes home. The necessary data on time allocation is not available to prove this mechanism and it remains a theory. However, we do know that six months after the intervention started the control group spent on average 4.35 hours working, 3.7 on housework and 3.19 with the child (Appendix: Table 5 & 6). The only significant difference for the preschool treatment was that respondent heads seem to spend more time on housework. They spent the same amount of time on work and with the child which essentially means that children in half-day have a bigger time gap during the day in which they do not spend with the respondent or at preschool. The question is then: who looks after the child? For respondent heads, and single caregivers especially, the options are few and this might just be an older sibling, a relative, or a neighbor. The preschool treatment was

particularly effective in improving children's peer problems and hyperactivity problems, i.e. attention-seeking behavior, which could be linked to a lack of attention at home. This explanation is supported by repeating the estimates in Table 6 for single caregivers which gives an even larger decreasing effect on mental health problems from the preschool treatment, also significant for internalizing problems (Appendix: Table 7). From Table 3, we remember that the preschool group's happiness level was 0.5 points higher than the control mean, which could also have a small positive impact on children's mental health.

Separation anxiety, on the other side, may contribute to cancelling out some of the positive effects. According to a research report on the prevalence, comorbidity, and predictors of anxiety disorders in children in rural north-eastern Uganda, children below 5 years were significantly more likely than older children to experience separation anxiety disorders, with a prevalence of 8% (Abbo, et al. 2013). Young children often prefer to be at home rather than at school, and full-day separation from the primary caregiver could entail problems for some children's social maturity and emotional stability (Felfe and Zierow 2018). This theory could help explain the lack of effect when the respondent is not head of the household. As discussed before, children whose caregivers are respondent heads are likely getting less attention at home and would therefore be less likely to develop problems with separation. Contradictory, children of non-head respondents who are used to more attention and care at home might experience a stronger negative effect from full-day separation from the primary caregiver. This balancing out of treatment effects ultimately leaves children of respondent heads with a positive effect on mental health, while children of non-head respondents see no effect on mental health.

6.2.2. Cash transfer treatment:

The cash transfer treatment had even stronger treatment effect heterogeneity than the preschool treatment. Children whose caregivers were head of the household improved their mental health, whereas those of non-head respondents deteriorated. The cash transfer group

reported the highest level of happiness, almost 1 point above the control mean. However, this is not necessarily reflective of better maternal mental health and could potentially be biased in expressing gratefulness for receiving the cash transfers or a hope for more. Additionally, it is reasonable to expect some positive effects from full-day preschool when the respondent is head, similar to the preschool treatment, seeing as the increase in full-day enrollment (although only 7.5%) was significant. Specifically, the cash transfer treatment reduced externalizing problems and conduct problems when the respondent is head. When the respondent is not head, the cash transfers lead to a significant increase in children's internalizing problems. Non-head respondents in the cash transfer group spent almost one hour more on work compared to the control group, and between 40-50% reported investing all or some of the money in a business.

Some studies have suggested that cash transfers can lead to increased conflict and domestic violence in the household. The woman's bargaining power increases when she receives the cash transfers which results in 'male backlash' where the partner increases emotional abuse as an instrument to reassert his control and/or to extract rents (Bobonis, González-Brenes, and Castro 2013). An increase in emotional abuse following cash transfers was found to be substantially greater in couples with low female decision-making power. Emotional abuse involves methods of psychological abuse (insults and threats) and controlling behavior (monitoring and restrictions), and has been associated with an increased risk for common mental disorders in women (Ishida, et al. 2010). A cash transfer program in Ugandan also found an increase in 'marital control' explained by the women having to "give money to their partner more frequently and partners taking money against their will" (Green, et al. 2015).

Data on domestic violence was collected at the same time as the SDQ was conducted. For the control group, 49% reported having experienced some form of domestic violence; 48% reported physical violence, and 10% reported emotional abuse. In our sample, 68% of respondents were married or living with a partner at some point during the last year: 30% of

respondent heads and 83% of non-head respondents. Among these, 76% experienced some form of domestic violence; 75% reported physical violence and 15% reported emotional abuse. Overall, the cash transfer treatment increased domestic violence, both physical and emotional (Appendix: Table 8 & 9). An increase in emotional abuse of 0.23 standard deviations is seen from the treatment when the respondent is not head, while an increase in physical violence by 0.23 standard deviations is observed when the respondent is head. The last result is somewhat unexpected seeing as the literature suggests that physical violence decreases when a women receives a cash transfer (Bobonis, González-Brenes, and Castro 2013). It should be mentioned, that the sample of respondent heads who were married or living with a partner is very small and these effects may not be completely representative. Nevertheless, children are sensitive to their environments and these negative effects of increased domestic violence could presumably affect the child's mental health negatively as well through worse mental health of the mother.

6.2.3. Combined treatment:

Although little effect was seen for the combined treatment overall, it did, in fact, increase emotional problems slightly when the respondent is not the head. The effects of the combined treatment can be explained as a combination of the preschool and cash transfer effects. First, we could expect similar negative effects from separation anxiety when the respondent is not head, as with the preschool treatment. Second, and similar to the cash transfer treatment, non-head respondents in the combined group also invested money in their businesses and worked almost one hour more each day. They also spent 30 minutes less with the child, which could aggravate the problem with separation. Third, emotional abuse increased by 0.19 standard deviations for non-head respondents, further supporting the hypothesis of 'male backlash' and rent-seeking behavior. To sum up, children of respondent heads had no treatment effects on their mental health problems while children of non-head respondents experienced a small increase in emotional problems, likely resulting from separation and domestic abuse.

7. CAVEATS

The complexity of mental health makes it difficult to discuss the mechanisms behind the observed effects. Child mental health involves a wide range of factors and this paper can only begin to analyze some of them. Previous literature supporting positive effects of cash transfer and preschool interventions on children's mental health generally look at more long-term perspectives. Given that this paper examines the effects after only one year it is likely that the outcomes could change over time and the effects for respondent heads and non-heads would eventually align giving a positive impact. Some other limitations should also be mentioned. First, this paper does not have a valid measure of maternal mental health. Using only the scores for happiness and stress is not sufficient to draw any conclusions on the treatment effects on the respondent's mental health, only assumptions. Second, it would be useful to have more accurate data on time allocation seeing as some respondents reported the time actively spent with the child while others reported the time when the child was around, also including time sleeping. Third, a greater overview of the household composition could be beneficial to better understand the responsibility of the household head as well as other household members.

8. CONCLUSION

This paper evaluates the impact of a randomized field experiment in rural and peri-urban Uganda offering free preschool, cash transfers or both to households with a female primary caregiver of a child age three to five. The main objective is to analyze the treatment effects on children's mental health after one year of program exposure. The results indicate that the effects on children's mental health problems depends on the treatment as well as certain characteristics of the female primary caregiver. Specifically, children of respondents who are household heads experienced improvements in total problems for the preschool treatment, and in externalizing problems for both the preschool and cash transfer treatments. Respondent heads are in most cases unmarried and with sole responsibility for the child. Balancing work

and child care can therefore be complicated and the child seems to benefit more in a preschool environment. Negative effects on children's mental health occur when the respondent is not head of the household and is receiving cash transfers. The negative effects are stronger for the cash transfer treatment, increasing externalizing problems, than for the combined treatment, increasing emotional problems. One explanation for this negative effect is the observed increase in emotional abuse for non-head respondents in both treatments. Emotional abuse has been linked to increased risk of mental health problems which could subsequently worsen the child's mental as well. This evidence sheds light on the importance of the home environment and household characteristics in the design of preschool and cash transfer programs, and in the evaluation of program effects on children's outcomes.

The importance of mental health has more recently received increased attention among researchers and policy makers, however, mainly in high-income countries. Program interventions generally have multiple outcomes but the effects on mental health are rarely examined, and even less so for children. Knowing the importance of children's mental health in their development future research could benefit from addressing and implementing mental health into their programs to a greater extent. Additional research should examine different variations of preschool and cash transfer programs, both short-term and long-term. This could also help to understand the lack of effect from the combined treatment and when the respondent is not the head. Future research should also investigate further the difference between half-day and full-day enrollment on children's mental health and whether some children are more suitable for one over the other depending on individual and household characteristics.

Nevertheless, evidence from this paper supports the positive effects of preschool and cash transfer programs on children's mental health in the case when the female primary caregiver is the household head and mostly takes care of the child alone. This further suggests that preschool programs could be more effective in general when childcare at home is limited.

REFERENCES

Abbo, Catherine, Eugene Kinyanda, Ruth B. Kizza, Jonathan Levin, Sheilla Ndyanabangi, and Dan J. Stein. 2013. "Prevalence, comorbidity and predictors of anxiety disorders in children and adolescents in rural north-eastern Uganda." *Child and adolescent psychiatry and mental health* 7 (1): 21-32.

Aboud, Frances E. 2006. "Evaluation of an early childhood preschool program in rural Bangladesh." *Early Childhood Research Quarterly* 21 (1): 46-60.

Achenbach, Thomas M, and Craig S. Edelbrock. 1978. "The classification of child psychopathology: a review and analysis of empirical efforts." *Psychological bulletin* 85 (6): 1275-1301.

Achenbach, Thomas M., Andreas Becker, Manfred Döpfner, Einar Heiervang, Veit Roessner, Hans-Christoph Steinhausen, and Aribert Rothenberger. 2008. "Multicultural assessment of child and adolescent psychopathology with ASEBA and SDQ instruments: research findings, applications, and future directions." *Journal of Child Psychology and Psychiatry* 49 (3): 251-275.

Baird, Sarah, Francisco H. G. Ferreira, Berk Özler, and Michael Woolcock. 2013. "Relative Effectiveness of Conditional and Unconditional Cash Transfers for Schooling Outcomes in Developing Countries: A Systematic Review." *Campbell Systematic Reviews* 8.

Behrman, Jere R., Yingmei Cheng, and Petra E. Todd. 2004. "Evaluating preschool programs when length of exposure to the program varies: A nonparametric approach." *Review of economics and statistics* 86 (1): 108-132.

Bernal, Raquel, and Camila Fernández. 2013. "Subsidized childcare and child development in Colombia: effects of Hogares Comunitarios de Bienestar as a function of timing and length of exposure." *Social Science & Medicine* 97: 241-249.

Bobonis, Gustavo J., Melissa González-Brenes, and Roberto Castro. 2013. "Public transfers and domestic violence: The roles of private information and spousal control." *American Economic Journal: Economic Policy* 5 (1): 179-205.

Center on the Developing Child at Harvard University. 2015. "Early Childhood Mental Health." *Center on the Developing Child at Harvard University.* March 17. Accessed February 7, 2020. https://developingchild.harvard.edu/science/deep-dives/mental-health/.

Cortina, Melissa A., Anisha Sodha, Mina Fazel, and Paul G. Ramchandani. 2012. "Prevalence of child mental health problems in Sub-Saharan Africa: A systematic review." *Archives of pediatrics & adolescent medicine* 166 (3): 276-281.

Felfe, Christina, and Larissa Zierow. 2018. "From dawn till dusk: Implications of full-day care for children's development." *Labour Economics* 55: 259-281.

Ginsburg, Kenneth R. 2007. "The importance of play in promoting healthy child development and maintaining strong parent-child bonds." *Pediatrics* 119 (1): 182-191.

Goodman, Anna, Donna L. Lamping, and George B. Ploubidis. 2010. "When to use broader internalising and externalising subscales instead of the hypothesised five subscales on the Strengths and Difficulties Questionnaire (SDQ): data from British parents, teachers and children." *ournal of abnormal child psychology* 38 (8): 1179-1191.

Goodman, Robert. 1994. "A modified version of the Rutter parent questionnaire including extra items on children's strengths: a research note." *Journal of Child Psychology and Psychiatry* 35 (8): 1483-1494.

Goodman, Robert. 1997. "The Strengths and Difficulties Questionnaire: a research note." *Journal of child psychology and psychiatry* 38 (5): 581-586.

Goodman, Robert. 2005. "Downloadable SDQs and related items." *Information for researchers and professionals about the Strengths & Difficulties Questionnaires.* Accessed November 2019. http://www.sdqinfo.org/py/sdqinfo/b3.py?language=Englishqz(UK).

Grantham-McGregor, Sally, Yin Bun Cheungb, Santiago Cuetoc, Paul Glewwed, Linda Richtere, Barbara Struppf, and International Child Development Steering Group. 2007. "Developmental potential in the first 5 years for children in developing countries." *Lancet* 369 (9555): 60-70.

Green, Eric P., Christopher Blattman, Julian Jamison, and Jeannie Annan. 2015. "Women's entrepreneurship and intimate partner violence: A cluster randomized trial of microenterprise assistance and partner participation in post-conflict Uganda." *Social science & medicine* (133): 177-188.

Hadley, Craig, Ayalew Tegegn, Fasil Tessema, Asefa Makkonen, and Sandro Galea. 2008. "Maternal and paternal anxiety-mood disorders and children's social, motor, and cognitive development in Sub-Saharan Africa." *Annals of Human Biology* 35 (3): 259-275.

Ishida, Kanako, Paul Stupp, Mercedes Melian, Florina Serbanescu, and Mary Goodwin. 2010. "Exploring the associations between intimate partner violence and women's mental health: evidence from a population-based study in Paraguay." *Social Science & Medicine* 71 (9): 1653-1661.

Kieling, Christian, Helen Baker-Henningham, Myron Belfer, Gabriella Conti, Ilgi Ertem, Olayinka Omigbodun, Luis Augusto Rohde, Shoba Srinath, Nurper Ulkuer, and Atif Rahman. 2011. "Child and adolescent mental health worldwide: evidence for action." *The Lancet* 378 (9801): 1515-1525.

Lee, Valerie E., David T. Burkam, Douglas D. Ready, Joann Honigman, and Samuel J. Meisels. 2006. "Full-Day versus Half-Day Kindergarten: In Which Program Do Children Learn More? VALERIE." *American Journal of Education* 112 (2): 163-208.

Lund, Crick, Mary De Silva, Sophie Plagerson, Sara Cooper, Dan Chisholm, Jishnu Das, Martin Knapp, and Vikram Patel. 2011. "Poverty and mental disorders: breaking the cycle in low-income and middle-income countries." *Lancet* 378 (9801): 1502-1514.

Martinez, Sebastian, Sophie Naudeau, and Vitor Pereira. 2012. *The promise of preschool in Africa: A randomized impact evaluation of early childhood development in rural Mozambique.* World Bank and Save the Children .

McLeod, Jane D., and Michael J. Shanahan. 1993. "Poverty, Parenting, and Children's Mental Health." *American Sociological Review* 58 (3): 351-366.

Mensah, Fiona K., and Kathleen E. Kiernan. 2010. "Parents' mental health and children's cognitive and social development." *Social psychiatry and psychiatric epidemiology* 45 (11): 1023-1035.

Mnookin, Seth. 2016. *Out of The Shadows: Making Mental Health a Global Development Priority.* Washington, D.C.: World Bank Group & World Health Organization.

Ozer, Emily J, Lia C.H Fernald, James G Manley, and Paul J. Gertler. 2009. "Effects of a conditional cash transfer program on children's behavior problems." *PEDIATRICS* (American Academy of Pediatrics) 123 (4): 630-637.

Ozer, Emily J., Lia C.H. Fernald, Ann Weber, Emily P. Flynn, and Tyler J. VanderWeele. 2011. "Does alleviating poverty affect mothers' depressive symptoms? A quasi-experimental investigation of Mexico's Oportunidades programme." *International Journal of Epidemiology* 40 (6): 1565-1576.

O'Connell, Mary Ellen, Thomas Boat, and Kenneth E. Warner. 2009. *Preventing Mental, Emotional, and Behavioral Disorders Among Young People: Progress and Possibilities.* National Research Council and Institute of Medicine, Washington, D.C.: National Academic Press.

Patel, Vikram. 2014. "Why mental health matters to global health." *Transcultural psychiatry* 51 (6): 777-789.

Robinson, Lara R., Rebecca H. Bitsko, Ross A. Thompson, Paul H. Dworkin, Mary Ann McCabe, Georgina Peacock, and Phoebe G. Thorpe. 2017. "CDC Grand Rounds: Addressing Health Disparities in Early Childhood." *Morbidity and Mortality Weekly Report* (U.S. Department of Health and Human Services, Centers for Disease Control and Prevention) 66 (29).

Schady, Norbert, and Christina Paxson. 2010. "Does Money Matter? The Effects of Cash Transfers on Child Development in Rural Ecuador." *Economic Development and Cultural Change* 59 (1): 187-229.

Thumann, Barbara F., Dipak Naker Ula Nur, and Karen M. Devries. 2016. "Primary school students' mental health in Uganda and its association with school violence, connectedness, and school characteristics: a cross-sectional study." *BMC public health* 16 (662).

Tsutsumi, Atsuro, Takashi Izutsu, and Akiko Ito. 2015. *Mental Health, Well-being and Disability: A New Global Priority Key United Nations Resolutions and Documents.* UNU, The University of Tokyo & United Nations, Tokyo: UN University.

Uganda Bureau of Statistics. 2018. *Uganda National Household Survey 2016/2017 Report.* Kampala: Uganda Bureau of Statistics.

Uganda Bureau of Statistics & ICF. 2018. *Uganda Demographic and Health Survey 2016.* Kampala, Uganda & Rockville, Maryland, USA: UBOS & ICF.

UN General Assembly. 1989. *Convention on the Rights of the Child.* United Nations, Treaty Series 1577.

Weatherholt, Tara, Rehemah Nabacwa, Luis Crouch, Jennifer Pressley, Rachel Jordan, Henry Healey, Katherine Merseth, and Eileen Dombrowski. 2018. *Uganda Early Years Study. Milestone 3: Final Report.* Research Triangle Park: RTI International.

Wooldridge, Jeffrey. 2002. *Econometric Analysis of Cross Section and Panel Data*. MIT press.

World Health Organization. 2005. "Child and adolescent mental health policies and plans." Mental Health Policy and Service Guidance Package, Geneva.

World Health Organization. 2019. *10 Facts on Mental Health.* October 2. Accessed April 10, 2020. https://www.who.int/news-room/facts-in-pictures/detail/mental-health.

APPENDIX

Figure 1: Map of Uganda with districts in the project highlighted

Figure 2: Scoring categories for the Strength and Difficulties Questionnaire

	Not True	Somewhat True	Certainly True
Emotional problems scale			
ITEM 3: Often complains of headaches… *(I get a lot of headaches…)*	0	1	**2**
ITEM 8: Many worries… (*I worry a lot)*	0	1	**2**
ITEM 13: Often unhappy, downhearted… (*I am often unhappy….)*	0	1	**2**
ITEM 16: Nervous or clingy in new situations… (*I am nervous in new situations…)*	0	1	**2**
ITEM 24: Many fears, easily scared *(I have many fears…)*	0	1	**2**
Conduct problems Scale			
ITEM 5: Often has temper tantrums or hot tempers (*I get very angry)*	0	1	**2**
ITEM 7: Generally obedient… *(I usually do as I am told)*	**2**	1	0
ITEM 12: Often fights with other children… *(I fight a lot)*	0	1	**2**
ITEM 18: Often lies or cheats *(I am often accused of lying or cheating)*	0	1	**2**
ITEM 22: Steals from home, school or elsewhere *(I take things that are not mine)*	0	1	**2**
Hyperactivity scale			
ITEM 2: Restless, overactive… *(I am restless…)*	0	1	**2**
ITEM 10: Constantly fidgeting or squirming *(I am constantly fidgeting….)*	0	1	**2**
ITEM 15: Easily distracted, concentration wanders *(I am easily distracted)*	0	1	**2**
ITEM 21: Thinks things out before acting *(I think before I do things)*	**2**	1	0
ITEM 25: Sees tasks through to the end… *(I finish the work I am doing)*	**2**	1	0
Peer problems scale			
ITEM 6: Rather solitary, tends to play alone *(I am usually on my own)*	0	1	**2**
ITEM 11: Has at least one good friend *(I have one goof friend or more)*	**2**	1	0
ITEM 14: Generally liked by other children *(Other people my age generally like me)*	**2**	1	0
ITEM 19: Picked on or bullied by other children… *(Other children or young people pick on me)*	0	1	**2**
ITEM 23: Gets on better with adults than with other children *(I get on better with adults than with people my age)*	0	1	**2**

TABLE 1: BALANCE TESTS OF BASELINE CHARACTERISTICS ACROSS TREATMENT AND CONTROL GROUPS

	Panel A: Baseline sample = 1496					Panel B: SDQ Sample = 1388				
	C	PS	CT	PC	Joint F-stat	C	PS	CT	PC	Joint F-stat
Christian	0.718	-0.035 (0.031)	-0.023 (0.031)	0.023 (0.030)	0.257	0.720	-0.038 (0.023)	-0.025 (0.032)	0.016 (0.032)	0.348
Muslim	0.274	-0.006 (0.031)	0.011 (0.030)	-0.039 (0.030)	0.349	0.272	0.007 (9.931)	0.012 (0.031)	-0.029 (0.031)	0.566
Household size	5.294	0.006 (0.143)	0.031 (0.138)	0.033 (0.145)	0.993	5.403	0.007 (0.149)	-0.029 (0.144)	-0.007 (0.151)	0.995
Adults	2.141	-0.045 (0.060)	-0.005 (0.063)	0.036 (0.067)	0.666	2.156	-0.033 (0.064)	-0.008 (0.067)	0.037 (0.071)	0.793
Age 0 to 5	1.430	0.013 (0.021)	0.026 (0.021)	0.021 (0.020)	0.616	1.433	0.014 (0.022)	0.025 (0.022)	0.014 (0.021)	0.740
Age 6 to 17	1.723	0.038 (0.115)	0.010 (0.110)	-0.025 (0.112)	0.959	1.815	0.026 (0.120)	-0.045 (0.115)	-0.059 (0.117)	0.884
Father present	0.607	0.038 (0.031)	-0.022 (0.032)	0.006 (0.032)	0.315	0.605	0.046 (0.032)	-0.021 (0.033)	-0.004 (0.033)	0.1962
Own a business	0.432	0.010 (0.032)	-0.001 (0.032)	0.013 (0.032)	0.967	0.444	-0.010 (0.033)	-0.006 (0.033)	0.015 (0.033)	0.895
Respondent age	33.066	0.560 (0.524)	0.185 (0.481)	0.024 (0.526)	0.717	33.597	0.598 (0.546)	0.192 (0.504)	0.013 (0.551)	0.692
Young mother	0.211	-0.003 (0.028)	-0.061** (0.026)	-0.008 (0.028)	0.078*	0.185	0.001 (0.028)	-0.045* (0.027)	0.007 (0.029)	0.201
Respondent head	0.291	-0.033 (0.030)	0.016 (0.030)	-0.005 (0.030)	0.464	0.296	-0.043 (0.031)	0.016 (0.032)	-0.002 (0.032)	0.284
Respondent married	0.699	0.052* (0.030)	0.029 (0.030)	0.002 (0.031)	0.283	0.699	0.062** (0.031)	0.027 (0.032)	-0.008 (0.032)	0.116
Single caregiver	0.187	-0.007 (0.027)	-0.002 (0.027)	-0.005 (0.027)	0.9937	0.191	-0.021 (0.028)	-0.002 (0.028)	-0.005 (0.029)	0.881
Completed primary	0.422	0.065* (0.034)	0.029 (0.034)	0.011 (0.035)	0.256	0.433	0.068* (0.036)	0.048 (0.036)	0.028 (0.036)	0.386
Target child age	48.925	-0.233 (0.554)	0.619 (0.556)	-0.404 (0.566)	0.322	49.091	-0.382 (0.576)	0.613 (0.580)	-0.444 (0.587)	0.274
Target child gender	0.507	-0.027 (0.036)	0.022 (0.036)	-0.040 (0.036)	0.341	0.497	-0.012 (0.037)	0.031 (0.036)	-0.031 (0.036)	0.428
Observations	412	363	364	357		372	349	341	335	

Note: The first column in Panel A display mean values of multiple household, respondent and target child observable characteristics for the control group (C). Following columns gives the difference between the control group and the three treatment groups; preschool (PS), cash transfer (CT) and combined (PC), respectively. The last column presents p-values for joint F-tests of equality of all treatment groups testing the null hypothesis that assignment to either PS, CT or PC has no effect on the outcome variable. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

TABLE 2: SCHOOL ENROLLMENT BY AGE

Control group	Baseline	6 months
Age 3	21%	79%
Age 4	45%	82%
Age 5	82%	93%
Mean	37%	82%

TABLE 3: EARLY CHILDHOOD DEVELOPMENT					
IDELA score	Total	Motor skills	Literacy	Numeracy	Social-Emotional
Preschool	0.0320***	0.0579***	0.0309**	0.0244**	0.0102
	(0.0107)	(0.0139)	(0.0141)	(0.0124)	(0.0140)
Cash transfer	0.0129	0.0208	0.0083	0.0138	0.0021
	(0.0108)	(0.0147)	(0.0138)	(0.0124)	(0.0142)
Combined	0.0292***	0.0466***	0.0402***	0.0219*	0.0075
	(0.0110)	(0.0141)	(0.0145)	(0.0126)	(0.0146)
Observations	1225	1225	1225	1225	1225
R-squared	0.4325	0.2983	0.3947	0.3705	0.2713
Control mean	0.5155	0.7076	0.4578	0.4607	0.4359
F-stat: PS=CT	0.0713	0.0083	0.0906	0.4075	0.5719
F-stat: PS=PC	0.7950	0.4002	0.5125	0.8465	0.8555
F-stat: CT=PC	0.1352	0.0709	0.0209	0.5346	0.7143
F-stat: joint	0.0104	0.0001	0.0146	0.1925	0.8432
Strata FE	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
ANCOVA	Yes	Yes	Yes	Yes	Yes

Note: All regressions are OLS, using IPW to adjust for attrition, and dependent variables are the IDELA scores. All regressions include strata fixed effects: district, respondent is the mother, respondent employment status, target child enrolled, and target child has younger siblings; and additional controls: target child age, target child gender, respondent completed primary, respondent age, young mother, respondent married, household size, and father lives in household. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

TABLE 4: PRESCHOOL SUMMARY STATISTICS	
Children per teacher	21
Children per school	81
Teachers with degree in preschool education	35%
Teachers with less than 5 years of experience	64%
School start time	08:00
Half day end	12:00
Full day end	16:00
Full day children	33%
Half day children	67%
Non-religious	56%
Religious	44%
Private	90%
Government	6%
Preschool + primary	81%
Mixed gender	100%
Facilities	
Library	29%
Playground	68%
Park / outdoor area	79%
Toilets/latrines	100%
Clean drinking water	93%
Breakfast	83%
Lunch	61%
General condition of the school	
Clean, good state of repair	86%
Unclean, good state of repair	6%
Unclean, bad state of repair	8%

TABLE 5: TIME ALLOCATION

Activity	Work	Housework	With child
Preschool	-0.1058	0.2883*	-0.3364*
	(0.2941)	(0.1699)	(0.1889)
Cash transfer	0.6807**	-0.2137	-0.1447
	(0.2812)	(0.1661)	(0.1814)
Combined	0.6299**	-0.1112	-0.5104**
	(0.2930)	(0.1610)	(0.1860)
Observations	1438	1438	1418
R-squared	0.2283	0.1675	0.1403
Control mean	4.3513	3.7034	3.1953
F-stat: PS=CT	0.0084	0.0040	0.2532
F-stat: PS=PC	0.0169	0.0171	0.3074
F-stat: CT=PC	0.8651	0.5349	0.0296
F-stat: joint	0.0084	0.0252	0.0310
Strata FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes
ANCOVA	Yes	Yes	Yes

Note: Regressions are ANCOVA, using IPW to adjust for attrition, and dependent variables are activities. All regressions include strata fixed effects and additional controls (refer to the notes in Table 3). Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

TABLE 6: TREATMENT EFFECT HETEROGENEITY - TIME ALLOCATION

	Work	Housework	Time with child
Preschool	-0.0107	0.2011	-0.2358
	(0.3361)	(0.2025)	(0.2174)
Preschool * Head	-0.3996	0.3327	-0.3754
	(0.6970)	(0.3774)	(0.4304)
Cash transfer	0.7658**	-0.2231	-0.1882
	(0.3330)	(0.1963)	(0.2163)
Cash transfer * Head	-0.2986	0.0424	0.1302
	(0.6381)	(0.3712)	(0.3982)
Combined	0.8591**	-0.0689	-0.4854*
	(0.3400)	(0.1915)	(0.2263)
Combined * Head	-0.7883	-0.1424	0.0887
	(0.6704)	(0.3608)	(0.3981)
Observations	1438	1438	1418
R-squared	0.2292	0.1688	0.1415
Control mean	4.3513	3.7034	3.1953
Strata FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes
ANCOVA	Yes	Yes	Yes
F-stat p-values			
Preschool=Preschool*Head=0	0.8149	0.1440	0.1513
Cash=Cash*Head=0	0.0476	0.4434	0.6748
Combined=Combined*Head=0	0.0410	0.7338	0.0214
Preschool+Preschool*Head=0	0.5227	0.0914	0.1032
Cash+Cash*Head=0	0.3863	0.5654	0.8625
Combined+Combined*Head=0	0.9023	0.4867	0.0793
Joint: Treated=0	0.0108	0.2276	0.1837
Joint: Treated*Head=0	0.7039	0.6156	0.6531
Joint: Treated=Treated*Head=0	0.0539	0.0976	0.1658

Note: Refer to notes in Table 5

TABLE 7: TREATMENT EFFECT HETEROGENEITY - SINGLE CAREGIVER

	Panel A: Total problems + two problem dimensions		
Problems score	Total	Internalizing	Externalizing
Preschool	0.0847	0.0754	0.0720
	(0.0743)	(0.0800)	(0.0700)
Preschool * Head	-0.5339***	-0.4382**	-0.4924***
	(0.1722)	(0.1707)	(0.1780)
Cash transfer	0.1118	0.1191	0.0750
	(0.0733)	(0.0780)	(0.0713)
Cash transfer * Head	-0.2246	-0.0129	-0.3835**
	(0.1675)	(0.1717)	(0.1703)
Combined	0.0548	0.0873	-0.0070
	(0.0747)	(0.0791)	(0.0731)
Combined * Head	-0.1338	0.0308	-0.2680
	(0.1767)	(0.1773)	(0.1781)
Observations	1388	1388	1388
R-squared	0.1733	0.1366	0.1803
Strata FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes
F-stat p-values			
Preschool=Preschool*Head=0	0.0080	0.0350	0.0219
Cash=Cash*Head=0	0.2376	0.2418	0.0790
Combined=Combined*Head=0	0.6787	0.4083	0.2720
Preschool+Preschool*Head=0	0.0037	0.0149	0.0102
Cash+Cash*Head=0	0.4522	0.4854	0.0465
Combined+Combined*Head=0	0.6200	0.4545	0.1071
Joint: Treated=0	0.4715	0.4796	0.5820
Joint: Treated*Head=0	0.0150	0.0167	0.0360
Joint: Treated=Treated*Head=0	0.0821	0.0215	0.2417

	Panel B: Four problem dimensions			
Problem score	Emotional	Peer	Conduct	Hyperactivity
Preschool	0.0697	0.0576	0.0303	0.0864
	(0.0823)	(0.0748)	(0.0745)	(0.0736)
Preschool * Head	-0.3505*	-0.4029**	-0.2643	-0.5389***
	(0.1855)	(0.1650)	(0.1767)	(0.1845)
Cash transfer	0.1081	0.0935	0.0689	0.0563
	(0.0794)	(0.0760)	(0.0747)	(0.0752)
Cash transfer * Head	0.0062	-0.0323	-0.4215**	-0.2251
	(0.1804)	(0.1788)	(0.1683)	(0.1702)
Combined	0.1207	0.0171	-0.0141	0.0237
	(0.0818)	(0.0756)	(0.0724)	(0.0769)
Combined * Head	-0.0614	0.01351	-0.1981	-0.2444
	(0.1866)	(0.1757)	(0.1862)	(0.1715)
Observations	1388	1388	1388	1388
R-squared	0.1088	0.1544	0.1375	0.1685
Strata FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
F-stat p-values				
Preschool=Preschool*Head=0	0.1681	0.0466	0.3164	0.01142
Cash=Cash*Head=0	0.3041	0.4321	0.0428	0.4106
Combined=Combined*Head	0.3134	0.6152	0.4555	0.2269
Preschool+Preschool*Head=0	0.0890	0.0178	0.1430	0.0074
Cash+Cash*Head=0	0.4776	0.7049	0.0196	0.2686
Combined+Combined*Head=0	0.7217	0.3374	0.2158	0.1485
Joint: Treated=0	0.4342	0.6022	0.6772	0.6690
Joint: Treated*Head=0	0.1700	0.0048	0.0939	0.0362
Joint: Treated=Treated*Head=0	0.2075	0.0089	0.4250	0.2657

Note: All regressions are OLS and dependent variables are the SDQ scores. All regressions include strata fixed effects and additional controls (refer to the notes in Table 3). Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

TABLE 8: DOMESTIC VIOLENCE

Violence	Domestic	Psychological	Physical
Preschool	0.0031	0.0587	-0.0248
	(0.0768)	(0.0870)	(0.0725)
Cash transfer	0.1791**	0.1893**	-0.1465*
	(0.0801)	(0.0926)	(0.0753)
Combined	0.1235	0.1679*	0.0825
	(0.0780)	(0.0891)	(0.0738)
Observations	1362	1362	1362
R-squared	0.1480	0.0565	0.1812
F-stat: PS=CT	0.0403	0.2017	0.0308
F-stat: PS=PC	0.1477	0.2593	0.1679
F-stat: CT=PC	0.5232	0.8355	0.4323
F-stat: joint	0.0678	0.1169	0.1066
Strata FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes
ANCOVA	Yes	Yes	Yes

Note: Regressions are ANCOVA, using IPW to adjust for attrition, and dependent variables are domestic violence measures. All regressions include strata fixed effects and additional controls (refer to the notes in Table 3). Dependent variables are in z-scores. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

TABLE 9: TREATMENT EFFECT HETEROGENEITY - DOMESTIC VIOLENCE

Dependent variable → violence measure	Domestic (1)	Psychological (2)	Physical (3)
Preschool	-0.0127	0.0556	-0.0443
	(0.0971)	(0.1118)	(0.09063)
Preschool * Head	0.0632	0.0182	0.0756
	(0.1487)	(0.1588)	(0.1440)
Cash transfer	0.1686	0.2308*	0.1119
	(0.1057)	(0.1268)	(0.0970)
Cash transfer * Head	0.0381	-0.1297	0.1148
	(0.1487)	(0.1560)	(0.1477)
Combined	0.1523	0.1936*	0.1084
	(0.1015)	(0.1146)	(0.0962)
Combined * Head	-0.1005	-0.0898	-0.0903
	(0.1441)	(0.1693)	(0.1377)
Observations	1362	1362	1362
R-squared	0.1489	0.0580	0.1823
F-stat p-values			
Preschool=Preschool*Head=0	0.8067	0.7167	0.8531
Cash=Cash*Head=0	0.0406	0.1063	0.0642
Combined=Combined*Head=0	0.2879	0.1727	0.5214
Preschool+Preschool*Head=0	0.6542	0.5154	0.7801
Cash+Cash*Head=0	0.0487	0.2722	0.0416
Combined+Combined*Head=0	0.6158	0.4087	0.8542
Joint: Treated=0	0.1651	0.1812	0.2652
Joint: Treated*Head=0	0.7598	0.7986	0.5612
Joint: Treated=Treated*Head=0	0.2003	0.2446	0.2711

Note: Refer to the notes in Table 8