

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/24248216>

Effects of a Conditional Cash Transfer Program on Children's Behavior Problems

Article in *PEDIATRICS* · May 2009

DOI: 10.1542/peds.2008-2882 · Source: PubMed

CITATIONS

42

READS

258

4 authors:



Emily J Ozer

University of California, Berkeley

69 PUBLICATIONS 6,551 CITATIONS

SEE PROFILE



Lia C H Fernald

University of California, Berkeley

170 PUBLICATIONS 6,098 CITATIONS

SEE PROFILE



James Manley

Towson University

22 PUBLICATIONS 425 CITATIONS

SEE PROFILE



Paul Gertler

University of California, Berkeley

233 PUBLICATIONS 14,049 CITATIONS

SEE PROFILE

Some of the authors of this publication are also working on these related projects:



EMERGE - promoting literacy in Kenya [View project](#)



Child growth and development in Madagascar [View project](#)

PEDIATRICS®

OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

Effects of a Conditional Cash Transfer Program on Children's Behavior Problems

Emily J. Ozer, Lia C. H. Fernald, James G. Manley and Paul J. Gertler

Pediatrics 2009;123:e630-e637

DOI: 10.1542/peds.2008-2882

The online version of this article, along with updated information and services, is located on the World Wide Web at:

<http://www.pediatrics.org/cgi/content/full/123/4/e630>

PEDIATRICS is the official journal of the American Academy of Pediatrics. A monthly publication, it has been published continuously since 1948. PEDIATRICS is owned, published, and trademarked by the American Academy of Pediatrics, 141 Northwest Point Boulevard, Elk Grove Village, Illinois, 60007. Copyright © 2009 by the American Academy of Pediatrics. All rights reserved. Print ISSN: 0031-4005. Online ISSN: 1098-4275.

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™



Effects of a Conditional Cash Transfer Program on Children's Behavior Problems

Emily J. Ozer, PhD^a, Lia C. H. Fernald, PhD, MBA^a, James G. Manley, PhD^b, Paul J. Gertler, PhD^{a,c}

^aSchool of Public Health; ^bHaas School of Business, University of California, Berkeley, Berkeley, California; ^cCollege of Business and Economics, Towson University, Towson, Maryland

The authors have indicated they have no financial relationships relevant to this article to disclose.

What's Known on This Subject

Research shows that CCT programs for very poor families can improve school enrollment, child nutrition, and health conditions such as stunting and anemia. No published research has investigated the impact of CCT on children's behavior problems.

What This Study Adds

Household participation in Mexico's *Oportunidades* was associated with lower aggressive and oppositional problems in children after controlling for a range of child characteristics and family-level socioeconomic factors. The strength of the effect represented a 10% decrement in problem behavior.

ABSTRACT

OBJECTIVES. Governments are increasingly using conditional cash transfer programs to reduce the negative effects of poverty on children's development. These programs have demonstrated benefits for children's nutrition and physical development, but the effect of conditional cash transfers on children's behaviors has not been systematically evaluated. The objective of this study was to evaluate the effects of a conditional cash transfer on children's behavior by using a quasi-experimental design.

METHODS. In 1997, the Mexican government initiated a large-scale conditional cash transfer (*Oportunidades*) in 506 very poor rural communities. *Oportunidades* provided cash transfers that were contingent on visits to medical practitioners, consumption of nutritional supplementation, and school enrollment. In 2003, an assessment of 4- to 6-year-old children in these households was conducted, and outcomes were compared with children from 152 additional poor rural communities who had been recruited by using rigorous matching procedures. The primary outcome measure for this analysis was maternal report of behavior problems in terms of anxiety/depressive and aggressive/oppositional symptoms. Analyses reported here compared 778 children from beneficiary households who had received 3.5 to 5.0 years of exposure to the program and a comparison group of 263 children who had received no exposure to the program at the time of assessment but whose families later enrolled in the program.

RESULTS. Participation in *Oportunidades* was associated with a 10% decrement in aggressive/oppositional symptoms but was not associated with significant decrements in anxiety/depressive symptoms or total problem behaviors while controlling for covariates. Effects of treatment did not differ by children's gender or ethnicity.

CONCLUSIONS. Although this large-scale conditional cash transfer program for poor Mexican families did not directly address children's behavior problems, it found evidence of indirect effects on children's behavior. Results suggest that interventions that focus on investing in basic human capital needs may exert longer term ripple effects on children's development. *Pediatrics* 2009;123:e630–e637

www.pediatrics.org/cgi/doi/10.1542/peds.2008-2882

doi:10.1542/peds.2008-2882

Key Words

conditional cash transfer, children, economic, behavior problems, Mexico

Abbreviations

CCT—conditional cash transfer
OLS—ordinary least squares
CI—confidence interval

Accepted for publication Dec 17, 2008

Address correspondence to Emily J. Ozer, School of Public Health, University of California, Berkeley, 50 University Hall, MC 7360, Berkeley, CA 94720-7360. E-mail: eozer@berkeley.edu

PEDIATRICS (ISSN Numbers: Print, 0031-4005; Online, 1098-4275). Copyright © 2009 by the American Academy of Pediatrics

EXTENSIVE RESEARCH HAS documented the inverse relationship between poverty and healthy child development,^{1–6} with pervasive poverty in the earliest years of life demonstrating the most deleterious effects on children's cognitive and psychosocial development. Several recent US studies that used planned or natural experiments have further demonstrated the salutary effects of familial economic improvement on the social and academic development of children.^{7–9} The developing economies of the world are home to extreme levels of chronic poverty, with nearly half of the global population estimated to live with incomes of less than US \$2 per day.¹⁰ Some of the most promising approaches to reducing extreme poverty are conditional cash transfer (CCT) programs. CCT programs provide cash gifts to poor families that are contingent on their adherence to activities that are expected to promote healthier child development. Dozens of middle- and low-income countries now are using CCT programs.^{11–13} Evaluation results from Mexico, Brazil, Argentina, and Nicaragua show that CCT programs increase school enrollment rates,^{14,15} raise household consumption,^{12,16} and improve health conditions such as stunting and anemia in children.^{12,17–20} We are not aware of any published investigation of the impact of CCT programs on children's behavior problems.

Originally called *Progres*a, *Oportunidades* began in 1997 as a national CCT program intended to relieve extreme poverty in Mexico. The government initially rolled out the program in rural areas and then extended it to urban areas. By 2004, *Oportunidades* had enrolled ~5 million families in all 31 states of Mexico. Nearly half of rural Mexican workers work in agriculture; the average hourly wage for agricultural workers is 7 pesos (roughly equivalent to \$0.09 or €0.07).²¹ The program distributed benefits only when family members complied with required behavior changes, including prenatal care; well-infant care and immunization; nutrition monitoring and supplementation; preventive checkups; and participation in educational programs regarding health, hygiene, and nutrition.¹⁷

By using a planned quasi-experimental design, this study uniquely contributes to the literature by testing the impact of *Oportunidades* on the behavior problems of 4- and 5-year-old children in rural areas. This age group is of particular interest developmentally because children's abilities to self-regulate behaviorally and develop successful relationships with adults and peers at this age are strongly predictive of later achievement, psychopathology, and delinquency.^{22–24} Quasi-experimental and experimental designs help to address the oft-debated issue of the directionality of the poverty–psychopathology relationship.^{25,26}

The central hypothesis of this study is that the effect of *Oportunidades* will extend beyond the proximal outcomes of nutrition, physical growth, and school attendance to exert longer term positive effects on child behavior problems among 4- to 5-year-olds who live in extreme poverty in rural Mexico. We specifically examined the impact of the intervention on “internalizing” symptoms of anxiety and depression and “externalizing” symptoms of aggression and oppositional behavior.^{27,28} This is the first study to our knowledge to investigate the impact of a CCT program on children's behavior problems or to investigate the effects of any kind of economic intervention on the psychosocial functioning of poor children in a developing economy.

Because *Oportunidades*'s program components did not explicitly address child behavior, our hypothesis is based on previous theory and research that suggests that the program could exert effects on child behavior via other pathways, such as improved child nutrition¹⁷ or by the amelioration of severe economic stress on the family, which could in turn promote parental mental health and family relationships.^{18,20} There is growing evidence that maternal psychopathology mediates the effects of economic disadvantage on their offspring's behavior problems, including poverty, as well as traumatic stressors such as war and domestic violence.^{29,30}

METHODS

Design and Sampling

Treatment Sample

The treatment sample was composed of children from 506 poor rural communities who had been receiving

Oportunidades benefits for 3.5 to 5.0 years.³¹ The program selected these communities in 1997 on the basis of the proportion of households in communities that lived in poverty by using data from the 1995 National Census. Within the communities that were assigned to the program, households were then selected for participation in *Oportunidades* according to an index of objective characteristics, such as housing materials, water and sanitation facilities, education, and family structure, which were shown to be good proxies for annual income.³² On average, 78% of the households in selected communities were classified as eligible for program benefits, and 97% of these households enrolled in the program.³¹

Eligible households began receiving program benefits between April 1998 and November 1999, conditional on meeting the *Oportunidades* program requirements. *Oportunidades* beneficiary families received cash transfers every 2 months, equivalent to an increase of ~25% of household income. Medical providers verified that households completed the required health care visits. The sample of communities was representative of the *Oportunidades* rural (<2500 inhabitants) beneficiary communities, and the families were the poorest 20% of the population with daily per capita income of \$2 or less in 7 Mexican states.

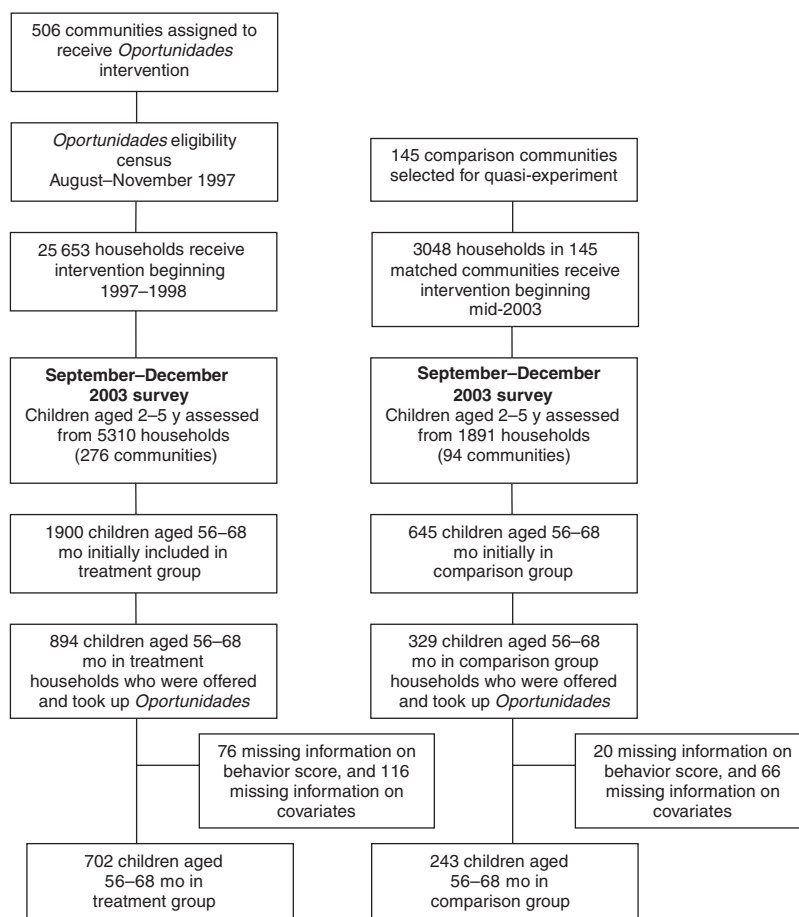
Comparison Sample of Communities

In 2003, the government added a comparison group of 152 communities as part of the 5-year evaluation of the *Oportunidades*. Substantial care was taken in selection of communities to minimize selection bias.³³ The criteria used for the selection of communities and households into the original treatment groups were fully documented, and all communities were motivated to participate in *Oportunidades*. Data from the 2000 census were used to select new comparison communities that were (1) from the same state as the original community in all but 1 case, (2) had not yet been incorporated into *Oportunidades*, and (3) most closely matched the original using propensity score methods applied to sociodemographic and infrastructure characteristics.^{34,35}

Sample Refinement at Household Level

We took several additional steps to minimize the likelihood that factors other than treatment status would differentiate the 2 samples (Fig 1). Originally, 2545 children (1900 treatment and 645 controls) who were aged between 56 and 68 months were in the quasi-experiment. We restricted our comparison sample to families who had been offered the *Oportunidades* program by 2005 and subsequently chose to enroll in the program. Thus, both the treatment and control samples consisted of children from families who were deemed eligible and took up the program. This approach minimized selection bias that was associated with program take-up. Observations that lacked necessary data reduced our sample size to 945 observations; there were no significant differences on any of our 27 covariates between the 96 children who were excluded from our study as a result of missing data versus those who were not excluded. Sta-

FIGURE 1
Flowchart of participants.



tistical power analyses indicated that our sample was adequate to detect a small effect of ≥ 0.20 .

Data Collection and Measures

All data were gathered via home interviews conducted in Spanish with indigenous translation as needed by teams of trained nurses from Mexico's *Instituto Nacional de Salud Publica*. Interviewers were blind to the aims, objectives, and hypotheses of the study; none of the questions in the interview pertained to participation in *Oportunidades*, and the interviewers believed that they were conducting a nutrition, health, and development assessment of poor, rural children. Only households with at least 1 child aged 0 to 5 were selected from the program participants. From these households, the child's mother or primary guardian was interviewed, in addition to any other adult who was older than 30 years and home at the time of the visit. The assessment of children extended beyond behavior outcomes presented here to outcomes that included growth, health, and physical development; these data have already been reported.¹⁷ During this same visit, a questionnaire was administered. Focus groups and cognitive testing ensured that the interpretation of the interview questions matched the original intent in English.

Child Behavior

We assessed child behavior by using an adapted version of the Behavior Problems Index administered through personal interview to the participating mothers, who were asked to report on the behaviors of their children in the past 3 months.³⁶ This measure has been widely used in large-scale survey studies^{37–39} rather than clinical settings; it does not have established cutoffs to indicate clinical significance. The Behavior Problems Index had not been previously validated in rural Mexico; the measure was adapted and supplemented to reflect the items considered to be most appropriate for the population and age group. The final version of the scale (Table 1) included 19 items (Cronbach's $\alpha = .82$ for the full scale; .73 for the 10 aggressive/oppositional items, and .71 for the 9 anxiety/depression items). We were not able to validate systematically our adapted measure as part of our investigation.

Demographic and Other Household-Level Control Variables

The demographic, educational, and economic variables were obtained via interview with the head of household or spouse and are shown in Table 2. All of these variables pertained to characteristics of the family and household at baseline (1997/1998). Data from baseline were available for children from treatment communities because it

TABLE 1 Adapted Behavior Problem Index

Item in Spanish	English Translation
<i>Discute mucho</i>	Argues a lot
<i>Se queja de que se siente solo</i>	Complains of being alone
<i>Llora mucho</i>	Cries a lot
<i>Es abusador, cruel o malo con los demás</i>	Acts mean/cruel with others
<i>Exige mucha atención</i>	Demands attention
<i>Destruye sus propias cosas</i>	Destroys own things
<i>Destruye las pertenencias de sus familiares</i>	Destroys things of family
<i>Desobedece en la casa</i>	Disobedient at home
<i>Tiene miedo de que pueda pensar o hacer algo malo</i>	Afraid of thinking/doing something wrong
<i>Siente que tiene que ser perfecto</i>	Feels as though s/he has to be perfect
<i>Siente o se queja de que nadie lo quiere</i>	Feels as though nobody loves her/him
<i>Siente inferior o como di no valiera nada</i>	Feels worthless or inferior
<i>Se involucra mucho en peleas</i>	Fights a lot
<i>Se junta con gente que se involucra en problemas</i>	Spends time with people who get in trouble
<i>Prefiere estar solo en vez de estar con otros</i>	Prefers being alone instead of with others
<i>Dice mentiras o hace trampas</i>	Tells lies, cheats
<i>Es nervioso, tenso</i>	Is nervous, tense
<i>Es demasiado ansioso o miedoso</i>	Is too anxious, afraid
<i>Se siente culpable por cualquier cosa</i>	Feels guilty for everything

had been collected in a baseline questionnaire. To obtain this information from comparison households, we used an additional questionnaire, which asked families retrospectively about easily recallable household demographic structure and ownership of assets in 1997/1998.

Data Analysis

We conducted our statistical analyses by using Stata 9.2 for Windows (Stata Corp, College Station, TX). We analyzed the data by using multivariate, linear, ordinary least squares (OLS) regression, regressing each outcome measure (anxiety/depression behavior problems, aggressive/oppositional behavior problems, and total behavior problems) on our independent variable of interest (*Oportunidades* program participation) and the control variables described in Table 2. Six of the 30 control variables were indicators for the state of residence, and SEs were clustered at the community level. Possible interaction effects for gender and ethnicity each were examined as the last step in the OLS regressions.

As a robustness check, we replicated the analyses by using propensity score matching, consistent with previous research showing that these methods lead to results similar to those generated by the randomized experimental design built into the first stage of the *Oportunidades* program.⁴⁰ On the basis of the methods described by Abadie and colleagues,^{34,41} we used the nearest neighbor matching method. We identified the 5 most similar control observations for each treatment observation, whereby similarity is defined as the minimum difference between the treatment and control on a set of covariates. We used the variables described in Table 1, with the

additional use of a heavy weighting procedure that prioritized that the control observations be from children of the same age (in months), same state, and same gender.

Ethical Review

The Research Committee of Mexico's *Instituto Nacional de Salud Publica* and the Committee for the Protection of Human Subjects at the University of California at Berkeley approved the *Oportunidades* evaluation. Participants received a detailed explanation of the procedures and signed an informed consent declaration before data collection occurred.

RESULTS

The mean age of the children in the entire study ($N = 945$) was 62 months (SD: 3.72), or 5 years and 2 months. Fifty-two percent of the children were male. Households had an average of almost 7 members, with between 1 and 2 children younger than 5 years and at least 2 older children and 2 working-aged adults. Consistent with the intentional recruitment of very poor families, levels of education and standard of living were low.

We first analyzed the data by using OLS regression in which SEs were clustered at the community level. Coefficients with their significance levels are presented in Table 3. After controlling for gender, ethnicity, and all covariates, results indicated a statistically significant program effect for aggressive/oppositional problems ($\beta = -.42$, $P = .03$, $t = -2.20$ [95% confidence interval (CI): -0.80 to -0.04]) but not anxiety/depressive ($\beta = -.29$, $P = .18$, $t = -1.35$ [95% CI: -0.70 to 0.13]) or total symptoms ($\beta = -.71$, $P = .05$, $t = -1.94$ [95% CI: -1.42 to 0.01]). Because the control sample mean for aggressive/oppositional symptoms was 4.41, the coefficient of -0.42 represents a 10% decrement in such problems. Lower levels of aggressive/oppositional symptoms were found for girls ($\beta = -.51$, $P = .001$, $t = -3.34$ [95% CI: -0.81 to -0.21]); child age and ethnicity showed no statistically significant effects. Gender, age, and ethnicity showed no statistically significant relationship with total symptoms or for anxiety/depressive symptoms. The effects of participation in the program did not differ by the gender or ethnicity of the child.

Finally, our replication of the OLS analyses by using the "nearest neighbor" propensity score approach yielded results that were almost identical ($\beta = -.43$, $z = 2.15$, $P = .03$ for aggressive/oppositional; $\beta = -.36$, $z = 1.78$, $P = .08$ for anxiety/depressive; and $\beta = -.79$, $z = 2.23$, $P = .03$ for total symptoms). The treatment effect for anxiety/depressive symptoms was slightly stronger than that for the original analysis and approached statistical significance.

DISCUSSION

This study of a large sample of young children who were living in extreme poverty in rural Mexico is to our knowledge the first to investigate empirically the association of CCT program participation and children's psychological functioning. We found that household participation in *Oportunidades*, 1 of the world's largest CCT

TABLE 2 Description of Treatment and Comparison Groups

Characteristic	Treated (n = 702)	Comparison (n = 243)	P
Child characteristics			
BPI, total score, mean (SD)	8.14 (4.27)	8.81 (4.20)	.060
BPI, anxiety/depressive subscale, mean (SD)	4.18 (2.48)	4.41 (2.45)	.250
BPI, aggressive/oppositional subscale, mean (SD)	3.96 (2.40)	4.41 (2.42)	.030
Child age, mean (SD), mo	61.96 (3.73)	61.90 (3.77)	.830
Child gender, % female	49	46	.370
Head of household characteristics			
Age, mean (SD), y	40.37 (10.95)	40.42 (11.95)	.960
Completed primary school, %	67	63	.390
Completed junior high school, %	11	12	.570
Completed high school, %	1	2	.320
Works as daily agricultural laborer, %	68	58	.130
Works as a nonagricultural laborer, %	10	17	.140
Works as a laborer for in-kind payment, %	10	14	.190
Works on communal land, %	9	3	.110
Speaks an indigenous language, %	51	23	.010
Demographic structure, mean (SD)			
Dependence ratio (ie, No. of nonworking household members per number of wage earners in household in 1997)	1.87 (1.35)	1.59 (1.24)	.030
Crowding index (ie, No. of people living in household divided by the No. of rooms in household in 1997)	4.65 (2.31)	4.03 (2.02)	.010
Crowding index multiplied by No. of children <12 y	15.33 (14.27)	11.75 (12.90)	.010
No. of children <12 y	2.79 (1.64)	2.33 (1.79)	.010
No. of children aged 5–15 who are not enrolled in school	0.13 (0.45)	0.19 (0.51)	.080
No. of paid workers aged 8–15 in household	0.09 (0.29)	0.06 (0.23)	.230
No. of people >65 y	0.11 (0.38)	0.09 (0.31)	.610
Household socioeconomic status			
Land owned, hectares, mean (SD)	1.43 (2.72)	1.48 (3.88)	.880
Household has a dirt floor, %	76	71	.390
Household has a gas heater, %	16	26	.100
Household is eligible to receive social security, %	4	11	<.001
Household owns ≥ 1 animal, %	80	58	<.001
Household has a blender, %	22	21	.750
Household has a radio, %	56	46	.060
Household has a television, %	36	35	.860
Household has water access on owned land, %	28	50	.010

Tests of difference conducted by using *t* test (for continuous variables) or a χ^2 test (for dichotomous variables) clustered at the community level. BPI indicates Behavioral Problems Index.

programs, was associated with lower aggressive and oppositional problems in children after controlling for a range of child characteristics and family-level socioeconomic factors; the strength of the effect was modest, representing a 10% decrement in problem behavior. The study did not find a statistically significant program effect for symptoms of anxiety and depression. Effects of program participation did not differ for boys versus girls or for children from indigenous versus nonindigenous families. Boys demonstrated higher levels of aggressive/oppositional symptoms than did girls, which confirms extensive research conducted in other countries⁴² and with older youth in Mexico City.^{43,44}

This study extends the growing literature on CCT programs that has demonstrated short-term developmental benefits in children's nutrition, physical growth, and school attendance.^{18,19,45} The findings of this study are consistent with a previous evaluation of a natural experiment in the United States that had found that income supplementation demonstrated an impact on older children's and young adolescents' aggressive/op-

positional but not anxiety/depressive symptoms.⁴⁶ Our differential results suggest several possible interpretations. First, the program may enable parents to provide more consistent structure and monitoring for their children, potentially conferring particular benefits for aggressive and oppositional problems.⁴⁷ Second, the impact of the program on nutrition^{18,19} may be more beneficial for the reduction of aggressive/oppositional problems; there is some evidence that early malnutrition is associated with later aggression as mediated by cognitive deficits.⁴⁸ This interpretation is consistent with previous research among low-income US families suggesting that limited food access was more strongly related to externalizing rather than internalizing symptoms.⁴⁹

This study did not examine mediating relationships or the effects of specific components of the program on child behavior; these questions constitute key next steps for future research. Several other limitations should be noted. First, this study does not benefit from the same strength of causal inference that could be drawn from a true experimental design despite the rigorous methods

TABLE 3 Unadjusted and Adjusted Effects of *Oportunidades* Program on Adapted BPI Subscales and Total Score

Parameter	β^a	SE	P	95% CI
Aggressive/oppositional				
Treatment (unadjusted)	-.45	0.18	.015	-.81 to -.09
Treatment, child age, gender, and state effects	-.44	0.17	.011	-.78 to -.10
Above + 28 additional controls	-.42	0.19	.029	-.80 to -.04
Anxiety/depressive				
Treatment (unadjusted)	-.23	0.23	.310	-.67 to 0.21
Treatment, child age, gender, and state effects	-.32	0.21	.120	-.73 to 0.08
Above + 28 additional controls	-.29	0.21	.180	-.70 to 0.13
Total Score				
Treatment (unadjusted)	-.68	0.37	.069	-1.41 to 0.05
Treatment, child age, gender, and state effects	-.77	0.34	.027	-1.44 to -.09
Above + 28 additional controls	-.71	0.36	.053	-1.42 to 0.01

N = 945. BPI indicates Behavior Problems Index.

^a Represents the mean change in the dependent variable associated with treatment (ie, change in the BPI).

used here to minimize selection effects. We do benefit, however, from the observation that a methodologic study on the *Oportunidades* program by using the same analytic methods confirmed that a quasi-experimental approach showed similar results to a true experiment.⁴⁰ Second, this study should be considered to be a conservative test of program effects because we reduced statistical power in our efforts to minimize selection bias and because the communities and families in the control group were more affluent than those in the treatment group. Third, systematic validation of the adapted measure used here to assess children's behavior problems in this rural Mexican population is needed.

CONCLUSIONS

Our findings suggest that interventions that invest in basic human capital needs may exert longer term ripple effects on children's development; however, additional intervention components focused on promoting effective parenting and children's psychological development are likely needed to yield major improvements in child behavior. Although the *Oportunidades* program demonstrated only a modest effect on aggressive/oppositional symptoms, extensive research on conduct problems in high-income countries suggests that even small differences early in development can magnify over time to influence children's developmental trajectory.^{50,51} Furthermore, only a handful of programs that directly addressed children's behavioral problems have been shown to demonstrate experimental evidence for even small effects on externalizing problems for young children⁵²; stronger effects have typically been found among older children identified at higher risk for aggression.^{53,54} Thus, an important area for future research would be to examine the effects of CCT programs on subgroups of

children who are expected to be at particularly higher risk for behavior problems.

ACKNOWLEDGMENTS

This research was supported primarily by the *Oportunidades* program and also by the Fogarty International Center of the National Institutes of Health (K01 TW06077, principal investigator Dr Fernald), the National Institutes of Health Roadmap for Medical Research Initiative (P20RR20817, principal investigator Dr Gertler), and National Institute of Child Health and Human Development (R01 HD44146-03, principal investigator Dr Gertler). Dr Ozer is supported by grants from the William T. Grant Foundation and the Centers for Disease Control and Prevention. None of the funders had any role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; or the preparation, review, or approval of the manuscript.

We appreciate the research participants and the other investigators of the *Oportunidades* evaluation; Thomas Cook and Peter Steiner for methodologic consultation; Laura Douglas for research assistance in the preparation of the manuscript; Ryo Shiba, Francisco Papaqui, Gustavo Olaiz, Aurora Franco, Mauricio Hernandez, Stefano Bertozzi, Lynnette Neufeld, and Juan Pablo Gutierrez at Mexico's National Institute of Public Health; Rogelio Gomez-Hermosillo, Concepcion Steta, and Iliana Yaschine of the *Oportunidades* program; and Nancy Adler at the University of California, San Francisco.

REFERENCES

- Duncan GJ, Brooks-Gunn J. Income effects across the life span: integration and interpretation. In: Duncan GJ, Brooks-Gunn J, eds. *Consequences of Growing up Poor*. New York, NY: Russell Sage; 1997:596-610
- Engle P. Influences of mothers' and fathers' income on children's nutritional status in Guatemala. *Soc Sci Med*. 1993; 37(11):1303-1312
- Evans GW, Kim P. Childhood poverty and health. *Psychol Sci*. 2007;18(11):953-957
- Keating DP, Hertzman C, eds. *Developmental Health and the Wealth of Nations: Social, Biological, and Educational Dynamics*. New York, NY: Guilford; 1999
- McLeod JD, Shanahan MJ. Trajectories of poverty and children's mental health. *J Health Soc Behav*. 1996;37(3):207-220
- Walker SP, Wachs TD, Gardner JM, et al. Child development: risk factors for adverse outcomes in developing countries. *Lancet*. 2007;369(9556):145-157
- Blau DM. The effect of income on child development. *Review Econ Stat*. 1999;81(2):261-276
- Duncan GJ, Brooks-Gunn J, Klebanov PK. Economic deprivation and early-childhood development. *Child Dev*. 1994;65(2 Spec No):296-318
- Morris P, Huston A, Duncan G, Crosby D, Bos H. *How Welfare and Work Policies Affect Children: A Synthesis of Research*. New York, NY: Manpower Demonstration Research; 2001
- World Bank. *Human Development Reports 2007/2008*. Washington, DC: World Bank; 2007
- de Janvry A, Sadoulet E. Making conditional cash transfer programs more efficient: designing for maximum effect of the conditionality. *World Bank Econ Rev*. 2006;20(1):1-29

12. Rawlings LB, Rubio GM. Evaluating the impact of conditional cash transfer programs. *World Bank Res Obs*. 2005;20(1):29–55
13. Soares S, Osória RG, Soares FV, Medeiros M, Zepeda E. Conditional Cash Transfers In Brazil, Chile And Mexico: Impacts Upon Inequality. International Poverty Centre 2007; Working Paper No. 0035. Available at: www.undp-povertycentre.org/pub/IPCWorkingPaper35.pdf. Accessed March 25, 2008
14. Heinrich CJ. Demand and supply-side determinants of conditional cash transfer program effectiveness. *World Dev*. 2007;35(1):121–143
15. Schultz TP. School subsidies for the poor: evaluating the Mexican Progresa poverty program. *J Dev Econ*. 2004;74(1):199–250
16. Hoddinott J, Skoufias E. *The Impact of PROGRESA on Consumption*. Washington, DC: International Food Policy Research Institute; 2000
17. Fernald LC, Gertler PJ, Neufeld LM. The role of cash in conditional cash transfer programs: an analysis of Mexico's Oportunidades. *Lancet*. 2008;371(9615):828–837
18. Gertler PJ. Do conditional cash transfers improve child health? Evidence from PROGRESA's controlled randomized experiment. *Am Econ Rev*. 2004;94(2):331–336
19. Behrman JR. *An Evaluation of the Impact of PROGRESA on Preschool Child Height*. Washington, DC: International Food Policy Research Institute; 2000
20. Rivera JA, Sotres-Alvarez D, Habicht JP, Shamah T, Villalpando S. Impact of the Mexican program for education, health, and nutrition (Progresa) on rates of growth and anemia in infants and young children: a randomized effectiveness study. *JAMA*. 2004;291(21):2563–2570
21. Verner D. *Activities, Employment, and Wages in Rural and Semi-Urban Mexico*. Washington, DC: World Bank; 2005. Report No. 3561
22. Lengua L. Associations among emotionality, self-regulation, adjustment problems, and positive adjustment in middle childhood. *J App Dev Psychol*. 2003;24(5):595–618
23. Masten AS, Coatsworth JD. The development of competence in favorable and unfavorable environments. *Am Psychol*. 1998;53(2):205–220
24. Patterson GR, Yoerger K. A developmental model for early- and late-onset antisocial behavior. In: Reid JB, Snyder J, Patterson GR, eds. *Antisocial Behavior in Children and Adolescents: A Developmental Analysis and Model for Intervention*. Washington, DC: American Psychological Association; 2002:147–172
25. Dohrenwend BP, Levav I, Shrout PE, et al. Socioeconomic status and psychiatric disorders: the causation-selection issue. *Science*. 1992;255(5047):946–952
26. Wadsworth ME, Achenbach TM. Explaining the link between low socioeconomic status and psychopathology: testing two mechanisms of the social causation hypothesis. *J Consult Clin Psychol*. 2005;73(6):1146–1153
27. Brown RT, Antonuccio D, DuPaul GJ, et al., eds. *Childhood Mental Health Disorders: Evidence Base and Contextual Factors for Psychosocial, Psychopharmacological, and Combined Interventions*. Washington, DC: American Psychological Association; 2008
28. Merrell KW. *Behavioral, Social, and Emotional Assessment of Children and Adolescents*. 2nd ed. Mahwah, NJ: Lawrence Erlbaum Associates Publishers; 2003
29. Fernald LC, Burke HM, Adler NE. Hypocortisolism in very low-income children of depressed mothers. *Dev Psychopathol*. 2008;20(2):423–436
30. Lieberman A, Van Horn P, Ozer EJ. The impact of domestic violence on preschoolers: predictive and mediating factors. *Dev Psychopathol*. 2005;17(2):385–396
31. Behrman JR, Todd PE. A report on the sample sizes used for the evaluation of the education, health and nutrition program (PROGRESA) of Mexico. Washington, DC: International Food Policy Research Institute; 1999. Available at: www.ifpri.org/themes/progresapdf/BehrmanTodd_size.pdf. Accessed March 15, 2008
32. Behrman JR, Todd PE. Randomness in the experimental samples of PROGRESA (education, health and nutrition program). Washington, DC: International Food Policy Research Institute; 1999. Available at: www.ifpri.org/themes/progresapdf/BehrmanTodd_random.pdf. Accessed March 15, 2008
33. Todd P. *Technical Note on Using Matching Estimators to Evaluate the OPORTUNIDADES Program for Six Year Follow-up Evaluation of OPORTUNIDADES in Rural Areas*. Philadelphia, PA: University of Pennsylvania; 2004
34. Abadie A, David D, Leber Herr J, Imbens G. Implementing matching estimators for average treatment effects in Stata. *Stata J*. 2004;4(3):290–311
35. Abadie A, Imbens G. large sample properties of matching estimators for average treatment effects. *Econometrica*. 2006;74(1):235–267
36. Zill N. Behavior Problems Index based on parent report; 1990. Available at: www.childtrends.org/Files/199103BehaviorProblemsIndexZill.pdf. Accessed November 5, 2007
37. Pachter LM, Auinger P, Palmer R, Weitzman M. Do parenting and the home environment, maternal depression, neighborhood, and chronic poverty affect child behavioral problems differently in different racial-ethnic groups? *Pediatrics*. 2006;117(4):1329–1338
38. Kahn RS, Wilson K, Wise PH. Intergenerational health disparities: socioeconomic status, women's health conditions, and child behavior problems. *Public Health Rep*. 2005;120(4):399–408
39. Lumeng JC, Gannon K, Cabral HJ, Frank DA, Zuckerman B. Association between clinically meaningful behavior problems and overweight in children. *Pediatrics*. 2003;112(5):1138–1145
40. Diaz JJ, Handa S. An assessment of propensity score matching as a nonexperimental impact estimator: evidence from Mexico's PROGRESA program. *J Hum Resour*. 2006;XLI(2):319–345
41. Abadie A, Imbens G. *Simple and Bias Corrected Matching Estimators for Average Treatment Effects*. Cambridge, MA: National Bureau of Economic Research; 2002
42. Achenbach TM, Howell CT, Quay HC, Conners CK. National survey of problems and competencies among four- to sixteen-year-olds: parents' reports for normative and clinical samples. *Monogr Soc Res Child Dev*. 1991;56(3):1–31
43. Caraveo-Anduaga JJ. A brief screening and diagnostic questionnaire of mental health problems among children and adolescents: syndrome algorithms and prevalence in Mexico City [in Spanish]. *Salud Mental*. 2007;30(1):48–55
44. Vera-Noriega JA, Laborin-Alvarez JF, Valenzuela MP. Teachers' evaluation of the behavior associated with attention deficit disorder with and without hyperactivity [in Spanish]. (TDAH). *SESAM: Servicios de Salud Mental*. 2007;12:20–29
45. Behrman JR, Sengupta P, Todd PE. *The Impact of PROGRESA on Achievement Test Scores in the First Year (Final Report)*. Washington, DC: International Food Policy Research Institute; 2000
46. Costello EJ, Compton SN, Keeler G, Agnold A. Relationships between poverty and psychopathology: a natural experiment. *JAMA*. 2003;290(15):2023–2029
47. Campbell SB, Shaw DE, Gilliom M. Early externalizing behavior problems: toddlers and preschoolers at risk for later maladjustment. *Dev Psychopathol*. 2000;12(3):467–488
48. Liu J, Raine A, Venables PH, Mednick SA. Malnutrition at age 3 years and externalizing behavior problems at ages 8, 11, and 17 years. *Am J Psychiatry*. 2004;161(11):2005–2013
49. Slack KS, Yoo J. Food hardship and child behavior problems among low-income children. *Soc Serv Rev*. 2005;79(3):511–536
50. Conduct Problems Prevention Research Group. Initial im-

- pact of the Fast Track Prevention Trial for Conduct Problems: I—the high-risk sample. *J Consult Clin Psychol*. 1999;67(5):631–647
51. Reid J, Eddy JM, Fetrow R, Stoolmiller M. Description and immediate impacts of a preventive intervention for conduct problems. *Am J Community Psychol*. 1999;27(4):483–517
 52. Domitrovich CE, Cortes R, Greenberg MT. Improving young children's social and emotional competence: a randomized trial of the Preschool PATHS Program. *J Prim Prev*. 2007;28(2):67–91
 53. Flannery DJ, Vazsonyi AT, Liau AK, et al. Initial behavior outcomes for the PeaceBuilders universal school-based violence prevention program. *Dev Psychol*. 2003;39(2):292–308
 54. Greenberg MT, Domitrovich C, Bumbarger B. The prevention of mental disorders in school-aged children: current state of the field. *Prev Treat*. 2001. Available at: <http://psycnet.apa.org/?fa=main.doiLanding&doi=10.1037/1522-3736.4.1.41a>. Accessed January 5, 2006

Effects of a Conditional Cash Transfer Program on Children's Behavior Problems

Emily J. Ozer, Lia C. H. Fernald, James G. Manley and Paul J. Gertler

Pediatrics 2009;123:e630-e637

DOI: 10.1542/peds.2008-2882

Updated Information & Services

including high-resolution figures, can be found at:
<http://www.pediatrics.org/cgi/content/full/123/4/e630>

References

This article cites 35 articles, 8 of which you can access for free at:
<http://www.pediatrics.org/cgi/content/full/123/4/e630#BIBL>

Subspecialty Collections

This article, along with others on similar topics, appears in the following collection(s):

Office Practice

http://www.pediatrics.org/cgi/collection/office_practice

Permissions & Licensing

Information about reproducing this article in parts (figures, tables) or in its entirety can be found online at:
<http://www.pediatrics.org/misc/Permissions.shtml>

Reprints

Information about ordering reprints can be found online:
<http://www.pediatrics.org/misc/reprints.shtml>

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™

