

Material hardship and children's social-emotional development: Testing mitigating effects of Child Development Accounts in a randomized experiment

J. Huang,* Y. Kim† and M. Sherraden‡

*College for Public Health and Social Justice, Saint Louis University, St. Louis, MO, USA

†School of Social Work, Virginia Commonwealth University, Richmond, VA, USA, and

‡Center for Social Development, George Warren Brown School of Social Work, Washington University in St. Louis, St. Louis, MO, USA

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Summary

Background Research has established a negative association between household material hardship and children's mental health. This study examines whether Child Development Accounts (CDAs), an economic intervention that encourages families to accumulate assets for children's long-term development, mitigate the association between material hardship and children's social-emotional development.

Methods Researchers conducted a randomized experiment of CDAs in Oklahoma, USA, with a probability sample ($N = 7328$) of all infants born in two 3-month periods in 2007. After agreeing to participate in the experiment, caregivers of 2704 infants completed a baseline survey and were assigned randomly to the treatment ($n = 1358$) or control group ($n = 1346$). The intervention exposed the treatment group to a CDA, which consisted of an Oklahoma 529 College Savings Plan account, financial incentives and financial information.

Results Material hardship has a negative association with the social-emotional development of children around the age of 4 years. Estimates from regression analysis indicate that CDAs mitigate about 50% of the negative association between material hardship and children's social-emotional development.

Conclusions Although they do not provide direct support for consumption in households experiencing material hardship, CDAs may improve child development by influencing parenting practices and parents' expectations for their children. We discuss the implications of using asset-building programmes to improve child development.

Keywords

asset building, Child Development Accounts, material hardship, social-emotional development

Correspondence:

Jin Huang, College for Public Health and Social Justice, Saint Louis University, 3550 Lindell Blvd, Tegeler Hall Room 211, St. Louis, MO 63103, USA.
E-mail: jhuang5@slu.edu

Introduction

Material hardship is far too common in USA households, and a household's inability to meet basic needs (e.g. food, housing and medical services; Ouellette *et al.* 2004) can have lasting effects in the lives of children (Coleman-Jensen *et al.* 2013). Even middle-income households experience material hardship (Sullivan *et al.* 2008). Moreover, material hardship is negatively associated with

children's psychological well-being, and this association manifests itself in several ways: aggressive behaviour, anxiety (Huang *et al.* 2010; Kleinman *et al.* 1998), internalizing behaviour problems (Weinreb *et al.* 2002), conduct difficulties (Emerson *et al.* 2011) and problems with positive behaviour adjustment (Dunifon & Kowaleski-Jones 2003).

Material hardship is also associated with parental psychological stress and conflict within families (Chien & Mistry

2013). Both of those factors may lead to parental anxiety and depression, problematic parenting practices and loss of social and psychological status (Ashiabi & O'Neal 2007). Experiencing material hardship is likely to disrupt parent–child interactions and result in ineffective parenting practices, eventually creating unfavourable conditions for child development (Conger *et al.* 1997). Some evidence suggests that certain parenting practices and parental attitudes mediate the relationship between material hardship and children's mental health (Huang *et al.* 2010; McConnell *et al.* 2011; Moffitt & the E-Risk Study Team 2002; Slack & Yoo 2005).

We examine whether giving parents access to Child Development Accounts (CDAs) for their children mitigates the association between material hardship and child development. Designed to encourage families to accumulate assets for children's long-term development, CDAs provide access to an investment infrastructure, information on asset accumulation and incentives to save (Sherraden 1991). Programmes that offer CDAs generally combine seed money (i.e. initial deposits) with progressive financial incentives (the greater the level of socioeconomic disadvantage in a participating household, the greater the value of the incentive). The accounts are designed so that accumulated assets will be used only to finance post-secondary education, purchase a first home or start a small business (Huang *et al.* 2013).

We ask whether programmes not based on consumption, such as programmes that offer CDAs, protect children from the adverse effects of material hardship. Sherraden (1991) theorizes that CDAs have positive effects on child well-being, and Huang and colleagues (2014a) show that CDAs in the SEED for Oklahoma Kids (SEED OK) experiment, a statewide policy test in the USA, improve the early social-emotional development of children. Some effects of asset holding are mediated through parents' mental health and parenting behaviours (Orr 2003; Yeung & Conley 2008; Zhan 2006). Although material hardship is likely to increase parents' psychological stress and negatively influence parenting

behaviours, CDAs may counteract some of those effects. As Figure 1 shows, CDAs could act as moderators, protecting children from negative parental reactions to material hardship.

Methods

The SEED OK experiment

This study uses data collected between 2008 and 2011 through SEED OK, a randomized experiment to study CDAs created by adapting tax-incentivized college-savings accounts offered through the Oklahoma 529 College Savings Plan (OK 529; Zager *et al.* 2010). SEED OK offered treatment participants information on OK 529 and provided three additional financial incentives (Figure 2). First, a state-owned OK 529 account was automatically opened for all, but one of the infants with mothers in the treatment group, and those accounts received a \$1000 initial deposit. Second, SEED OK encouraged treatment participants to open a separate participant-owned OK 529 account and offered them a time-limited \$100 incentive if they did so. Third, SEED OK offered savings matches to income-eligible treatment participants for deposits made into participant-owned accounts. Treatment participants also received account statements and regular correspondence (e.g. letters, postcards and brochures). The study occasionally sent them small gifts, such as children's books and T-shirt.

In contrast, control participants did not receive any intervention element discussed previously, and SEED OK did not encourage them to open a participant-owned account; however, many people open accounts to save for their child's college, and control participants, like others, are free to do so without prompting by an intervention. The details of the experiment and the flow chart can be found in Huang, Sherraden and Kim and colleagues (2015). As of December 2014, about 17% of treatment participants held a participant-owned account for their children, whereas less than 1% of control participants held such an account.

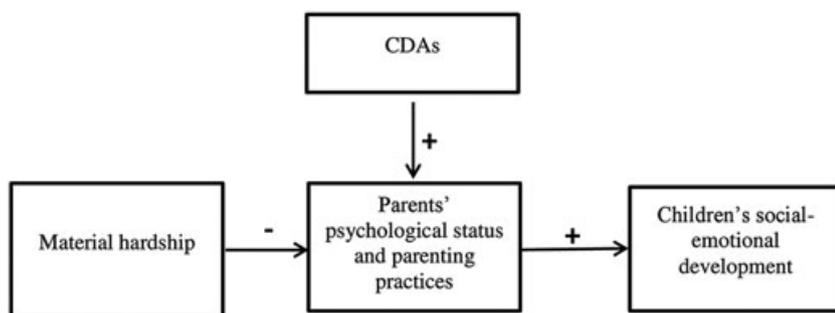


Figure 1. A conceptual model of Child Development Accounts' impacts on material hardship and child development.

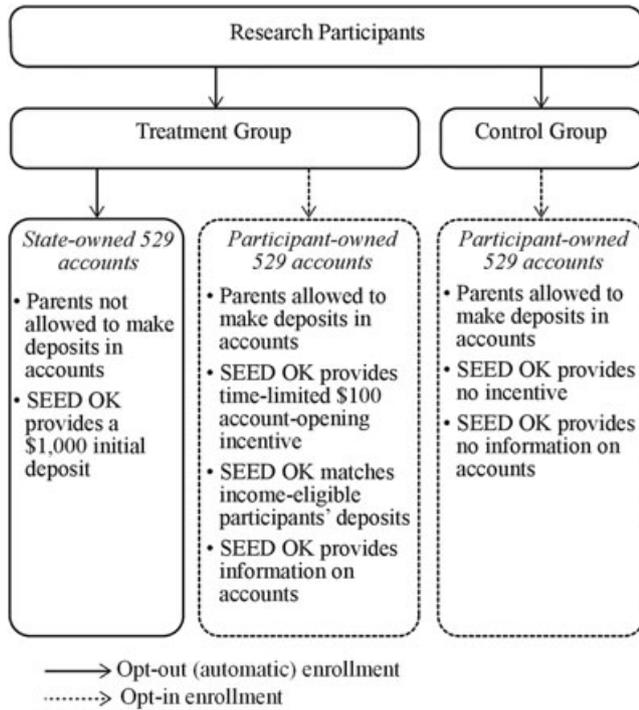


Figure 2. Study design, enrollment and retention for SEED OK participants. Adapted from Huang, Nam and Sherraden, 2013, p. 6. Copyright 2012 by the American Council on Consumer Interests. OK 529 accounts, Oklahoma 529 College Savings Plan accounts, SEED OK = SEED for Oklahoma Kids.

Data and sample

With assistance from the Oklahoma State Department of Health, SEED OK accessed the birth records of 7328 infants born in the state during two 3-month periods and, after excluding some deemed ineligible, drew a probability sample from the primary caregivers of the 7115 remaining infants. The team was unable to locate 982 of the 7115 caregivers, and 3429 refused to participate or did not complete a baseline interview. Three racial and ethnic minority groups (African Americans, American Indians and Hispanics) are oversampled to ensure sufficient statistical power for subgroup analysis. The resulting sample of 2704 caregivers agreed to participate in the study and completed the baseline survey between fall 2007 and spring 2008 (a 38% response rate). Ninety-nine per cent of sample members are mothers of the infants identified through birth records. For convenience, we refer to all caregivers as ‘mothers’. A comparison of 2704 mothers who completed the baseline survey with 3429 mothers who did not suggest that the two groups do not differ significantly on most of the characteristics recorded in birth records (e.g. mother’s race, education, marital status and child’s birthweight; Nam *et al.* 2013).

SEED OK randomly assigned 1358 mothers to the treatment group and 1346 to the control group (Marks *et al.* 2008). The Oklahoma State Treasurer’s office notified mothers in both groups of their assignments, sending information about OK 529 and the SEED OK experiment to treatment mothers. In a spring 2011 follow-up survey, the researchers reached 2251 of the 2704 mothers interviewed in the baseline. The experiment’s protocol was approved by the institutional review boards of all participating organizations, and all participants in the experiment granted informed consent in the baseline survey. We excluded 43 mothers whose responses lack valid information on material hardship or children’s social-emotional development. The final analytic sample consists of 2208 mothers: 1121 in the treatment group and 1087 in the control group.

Dependent variable

In the follow-up survey, we measured children’s social-emotional development using a shortened version of the Ages and Stages Questionnaire: Social Emotional (ASQSE). It is a reliable and valid standardized measure of social-emotional development during the first 5 years of life (Squires *et al.* 2002). Because children of caregivers in both groups were about 4 years old at the time of the follow-up survey, we included 17 ASQSE items for children aged 48 months. The items cover self-regulation (nine items), compliance (two items) and interaction with people (six items). Each item asks about the frequency of a particular behaviour (e.g. ability to settle down after periods of exciting activity). Possible responses include *most of the time* (coded 0), *sometimes* (coded 5) and *rarely or never* (coded 10). The sum of the mother-reported responses to these items ranges from 0 to 170; lower scores indicate better functioning. Cronbach’s alpha for the social-emotional development scale is 0.70, which suggests a moderate level of internal consistency.

Independent and control variables

To measure the level of material hardship in participants’ households, we created a scale from mothers’ responses to five baseline survey items (Conger *et al.* 2002). Questions asked SEED OK mothers whether their households had enough money to pay for necessary housing, clothing, furniture or equipment, food and medical care. Possible responses include *strongly agree* (coded as 3), *agree* (2), *disagree* (1) and *strongly disagree* (0). Following previous studies (Conger *et al.* 2002; Wikoff *et al.* 2015), we use the sum (0–15) of the responses to

these five items as a measure of material hardship; higher scores indicate more material hardship. Cronbach's alpha for this scale is 0.87. The second main independent variable indicates whether the mother is assigned to the treatment group (coded as 1) or to the control group (0).

Multiple baseline demographic and socioeconomic characteristics serve as control variables. The child's characteristics include age in months, gender and race. The mother's characteristics include age, education, marital status and employment status, as well as a shortened four-item Center for Epidemiologic Studies Depression Scale. We also include several measures of household characteristics (e.g. household size, number of children, housing status, receipt of welfare benefits and income-to-needs ratio). Details on the depression scale and the household characteristics can be found in Huang, Sherraden (1991).

Statistical analysis

We regressed the ASQSE score in the follow-up survey on material hardship, the treatment status variable, the term for the interaction between material hardship and treatment status and other control variables. In regression analyses, the coefficient of material hardship represents an assessment of the association between material hardship and children's social-emotional development among those in the control group. The coefficient of treatment status is an estimate of the impact of the CDAs on social-emotional development among those with a material hardship scale of 0. The main parameter of interest is the regression coefficient of the interaction term, which indicates the effect of the CDA intervention on the association between material hardship and social-emotional development. If the CDA intervention mitigates this association, the coefficient should be negative and statistically significant. We report two sets of results for the regression analysis: (1) one non-weighted set and (2) another set adjusted with the sampling weight. The weighted analysis adjusts for oversampling and observed non-participation bias (Marks *et al.* 2008).

Results

Descriptive statistics

Table 1 reports the weighted baseline characteristics of the treatment and control groups in the analytic sample ($N = 2208$). We find no significant differences between the groups on any of the observed demographic characteristics, implying that attrition occurs equally across treatment and control groups. Table 1

Table 1. Demographic and socio-economic characteristics of the analytic sample ($N = 2208$)

Characteristic	Control ($n = 1087$)	Treatment ($n = 1121$)
Child's characteristics		
Male (%)	52.6	53.5
Age (mean, by month)	54.4	54.4
Race (%)		
Non-Hispanic White	66.0	65.6
Non-Hispanic African American	9.0	8.7
Non-Hispanic American Indian	11.5	11.5
Non-Hispanic Asian	0.8	1.5
Hispanic	12.8	12.7
Mother's characteristics		
Age (mean, by year)	25.9	25.8
Education (%)		
Below high school diploma [†]	21.2	20.8
High school	33.5	32.6
Some college	25.6	25.3
Four-year college or above	19.7	21.3
Marital status (% married)	62.0	61.2
Employment status (% employed)	46.3	46.2
Depressive symptoms (mean)	1.7	1.7
Household characteristics		
Household size (mean)		
Number of children (%)	4.1	4.2
1	34.7	31.6
2	35.6	35.9
3 or more	28.8	30.9
Missing	0.9	1.6
Home ownership (% yes)	43.7	43.6
Received welfare benefits (% yes)	40.1	41.4
Income-to-needs ratio (%)		
<200%	65.5	64.8
200–400%	19.0	18.7
>400%	13.3	12.4
Missing	2.3	4.1
Child's social-emotional development		
17-item Ages and Stages Questionnaire	29.6 (28.4, 30.8)	28.5 (27.4, 29.7)
Social Emotional score [‡]		
Material hardship		
Material hardship scale score [‡]	4.7 (4.5, 5.0)	4.8 (4.6, 5.0)

Results in this table are weighted to be representative of all infants born during two 3-month periods in Oklahoma in 2007 (April–June and August–October).

[†] High school diploma or general equivalency diploma.

[‡] 95% confidence intervals are reported in parentheses.

also presents weighted descriptive statistics on children's social-emotional development and material hardship. About 3 years after programme implementation, children of treatment mothers had a mean ASQSE score that was 1.1 points lower than the mean score for children of control mothers (28.5 vs. 29.6, $P = 0.11$). Although the empirical range of the material hardship scale is from 0 to 15, the mean scores are 4.7 for the control group and 4.8 for the treatment group. Treatment and control groups did not differ significantly in their scores.

Regression results

As shown in Table 2, the non-weighted estimates suggest that a 1 point increase in the material hardship score raises the ASQSE score by 0.84 points [95% confidence interval (CI) [0.50, 1.19]; $P < 0.001$] among children in the control group. The coefficient for treatment status is positive but non-significant; treatment participants with a score of 0 on the material hardship scale (i.e. the lowest level of material hardship) have a mean ASQSE score that is 0.98 point (95% CI [-1.64, 3.60]) higher than the mean ASQSE score for the control group. The coefficient for the interaction between treatment status and material hardship is negative and statistically significant ($b = -0.44$; 95% CI [-0.88, -0.01]; $P < 0.05$). That is, the marginal effect of material hardship in the treatment group is 0.44 point lower than that in the control group. A 1 point increase in the material hardship score raises the ASQSE score by 0.40 point ($0.84 - 0.44$) among the children of caregivers in the treatment group.

As the second panel of Table 2 shows, results from the weighted analysis are consistent with the non-weighted results, and details on the interaction effect are presented in Figure 3, which illustrates the weighted point estimates and 95% confidence intervals for the treatment–control differences in social-emotional development by level of material hardship. The negative slope of the dotted line suggests that CDAs mitigate the association between material hardship and social-emotional development (i.e. treatment effects are greater at higher levels of material hardship). For material hardship scores below 7, the 95% confidence interval of the treatment effect on social-emotional development includes the reference line of 0. That is, the magnitude of the CDA

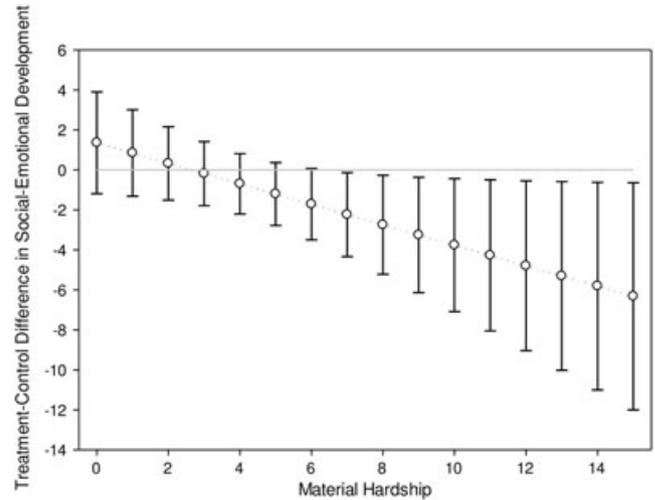


Figure 3. Treatment–control difference and 95% confidence interval in social-emotional development by level of material hardship. This figure plots the weighted results from Table 2. The circles indicate the regression point estimate for the treatment–control difference, and the bordered vertical lines indicate confidence intervals.

intervention's impact is not sufficient to positively affect children living in households with a material hardship score below 7. However, for material hardship scores of more than 7, the 95% confidence interval of the treatment effect is below the reference line of 0; this suggests that exposure to the treatment has significant and positive effects on children's social-emotional development. For example, at the highest level of hardship (a material hardship score of 15), the treatment–control difference in the ASQSE score would reach -6.3 points ($-0.51 \times 15 + 1.36$). These results imply that (i) the CDA intervention contributes to the improvement of

Table 2. OLS regression results: material hardship, Child Development Accounts and social-emotional development ($N = 2\,208$)[†]

Variables	Non-weighted			Weighted [‡]		
	<i>b</i>	SE	95% CI	<i>b</i>	SE	95% CI
Material hardship	0.84***	0.18	0.50, 1.19	0.99***	0.19	0.99, 1.36
Treatment status	0.98	1.33	-1.64, 3.60	1.36	1.30	-1.19, 3.90
Treatment status × material hardship	-0.44*	0.22	-0.88, -0.01	-0.51*	0.26	-1.01, -0.01

OLS, ordinary least squares; *b*, regression coefficient; SE, standard error; CI, confidence interval.

[†] The analyses control for baseline characteristics reported in Table 1.

[‡] The results in the second panel are weighted to be representative to infants born during two 3-month periods in Oklahoma in 2007 (April–June and August–October).

* $P < 0.05$.

** $P < 0.01$.

*** $P < 0.001$.

children's social-emotional development and (ii) the impact of the intervention increases with the level of material hardship.

Discussion

Our study is the first to examine whether CDAs mitigate material hardship's negative association with children's socio-emotional development. We find that material hardship is negatively linked to social-emotional development in early childhood, but the results also show that the term for the interaction between treatment status and material hardship is negatively associated with the ASQSE score. This suggests that CDAs offer children some protection from the adverse consequences of material hardship. The mitigating effect of CDAs increases as the level of material hardship grows. By comparing the ASQSE scores of children whose mothers have the highest and lowest levels of material hardship (children whose mothers have a hardship score of 15 versus those whose mothers have a score of 0), we find that the differences vary by treatment status: a 14.9-point difference among children with mothers in the control group and a 7.2-point difference among children with mothers in the treatment group. In weighted results from regression analyses that assume a linear association between material hardship and children's social-emotional development, CDAs mitigate about half (i.e. $-0.51/0.99$) of the association between material hardship and children's social-emotional development.

SEED OK does not offer direct support for household consumption, and financial incentives were deposited into a state-owned OK 529 account that can only be accessed to pay for the post-secondary education of beneficiaries who were approximately 4 years old at the time of the follow-up. How might we explain the mitigating effect of CDAs if the accounts moderate the association between material hardship and child development but do not increase household consumption? It seems likely that CDAs improve parents' mental health, attitudes and parenting practices. The CDA intervention significantly reduces mothers' depressive symptoms (Huang *et al.* 2014b), increases parents' educational expectations for their children (Kim *et al.* 2015) and lowers the frequency with which mothers scream at their children (Nam *et al.* 2014). Those effects may in turn increase the quality of parent-child interactions and promote child development. Future studies should investigate the effects of CDAs on children's outcomes, such as cognitive development and school performance, over time and developmental stages.

The explanation that the mitigating effects of CDAs alter parenting attitudes and behaviour is supported by findings from interviews conducted with 60 SEED OK mothers (40 in the treatment group and 20 in the control group) when the children were about 3 years old. Interviewed treatment mothers reported that the state-owned OK 529 accounts made them feel optimistic about their children's future. One treatment mother who experienced great financial pressure during the latest economic recession stated that the account made her feel 'a whole lot better' and caused her to 'have some hope for' her child (Gray *et al.* 2012, p. 64). Another said that the account 'give[s her] something to look forward to – to know that it would help' (p. 56). The interviews also suggest that CDAs are more meaningful to treatment mothers with low levels of income and education than to those with high levels of income and education.

This study has several limitations. First, the 17-item ASQSE might not be ideal for this study because it does not assess several dimensions of social-emotional development. Second, SEED OK mothers' self-reports of their children's social-emotional development are subject to measurement error. Third, the study response rate (38%) is rather low. It seems to be largely due to the requirement that study participants provide their child's Social Security number before the treasurer's office would open the state-owned OK 529 account for that child (Marks *et al.* 2008; Zager *et al.* 2010). Although most estimates were the same for participant and non-participant mothers, and treatment and control groups were well balanced in the final analytic sample, the low response rate and modest sample attrition may raise questions about external validity. Fourth, despite of the rigorous research design, it is possible that other mechanisms explain the relationship between material hardship and children's socio-emotional outcomes. For example, both material hardship and child development could be the consequences of parental psychological status. That would be the opposite of the model proposed in Figure 1.

Findings from this study have several policy implications. First, CDAs appear to counteract some of the negative effects of material hardship and may have a long-term impact on children's mental health. They may be an important complement to income support and early intervention programmes for children. Second, results indicate that asset-building programmes may be particularly important for households exposed to material hardship. The psychological effects of CDAs likely are associated with holding an account that was automatically opened as part of the experiment, that includes seed money, and that provides communications about

the account's status. Among those experiencing material hardship, the psychological effects of having a CDA do not seem to be solely associated with saving behaviours (e.g. opening a participant-owned 529 account and making individual deposits; Huang, Sherraden 1991). This suggests that appropriate policy design is important if children's asset-building programmes are to be successful. In summary, SEED OK shows that CDAs with initial deposits enable universal participation and allow all children, including those from disadvantaged backgrounds, to benefit from asset building.

Key messages

- Household material hardship is negatively associated with children's social-emotional development in early childhood.
- The regression analysis predicts that Child Development Accounts (CDAs) mitigate about 50% of the negative association between material hardship and children's social-emotional development.
- CDAs can be an important complement to income support and early intervention programmes for children.
- Future research should investigate the effects of CDAs on other child outcomes.

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