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Socioeconomic Status and Early Savings Outcomes

Evidence from a Statewide Child Development Account Experiment

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Socioeconomic Status and Early Savings Outcomes: Evidence from a Statewide Child Development Account Experiment

The SEED for Oklahoma Kids (SEED OK) experiment is a large-scale study of universal and progressive Child Development Accounts, with random selection from the full population of newborn children and random assignment to treatment and control groups. Using an automatic enrollment strategy, SEED OK opened a state-owned 529 college savings plan account for every treatment child, with an initial deposit of $1,000. In addition, treatment families were encouraged to open their own Oklahoma 529 accounts, and lower-income treatment families qualified for matches on deposits into these participant-owned accounts. This study examines early savings outcomes, asking: (1) whether outcomes varied by socioeconomic status (SES), and (2) whether the impact of the SEED OK treatment varied by SES. The SEED OK treatment had a clear impact on some of the outcomes examined (e.g., whether a child had a 529 account, whether parents had set aside college savings for her, whether she had any 529 assets, and the amount of 529 assets). SEED OK did not clearly increase the amount of individual 529 savings set aside by parents. These patterns hold for diverse SES subgroups. Even with the SEED OK treatment, advantaged groups tended to have more favorable outcomes, except when outcomes were directly related to automatic components of the treatment. *If universality is a goal, the evidence clearly favors automatic account opening with an initial and automatic deposit.*

Key words: *experiment, saving, asset-building, wealth accumulation, low-income, child development accounts*

Introduction

College education is a primary determinant of long-term economic success and a key mechanism of social mobility (Haveman and Wolfe, 1995; Kane, 2004; Baum and Ma, 2007). However, college attendance and completion rates differ substantially by household income (Kane, 2004; Brown, Chingos, and McPherson, 2009; Baum, Ma, and Payea, 2010). During the last three decades, college tuition and related costs have risen much more rapidly than the inflation rate (Kane, 2004), while financial aid has shifted away from need-based aid toward a greater reliance on student loans (Condon and Prince, 2008). As a result, saving has become more important as a strategy for financing college. But disadvantaged families—e.g., lower-income, African-American, and Hispanic—are less likely than others to have saved for their children's education (Sallie Mae and Gallup, 2010), and the lack of savings may create an additional barrier to college attendance for children in these families.

To encourage families to save for postsecondary education, the federal government authorized college savings plans in 1996. These plans—often called 529 plans, after the relevant section of the Internal Revenue Code—are established by state governments and offer a limited selection of funds with a variety of risk and return characteristics. 529 plans have tax benefits: Qualified withdrawals from 529 plans are exempt from federal and state taxes. Also, many state plans allow annual state income tax deductions for qualified contributions (U.S. Department of Treasury, 2009; Lassar et al., 2010).

Another policy tool designed to facilitate saving and asset building for college[1] are Child Development Accounts (CDAs). First proposed by Michael Sherraden (Sherraden, 1991; see also a proposal by Goldberg, 2005), CDA initiatives create savings or investment accounts for children. CDAs can be opened as early as birth, and they aim to encourage lifelong saving and asset building for long-term development. Typically, savings accumulated in CDAs may be used to purchase a first home or to start a small business, as well as to finance postsecondary education. CDA programs have been implemented around the world (Chowa and Ansong, 2009; Cramer and Newville, 2009; Masa et al., 2009; Nam and Han, 2009; Mason et al., 2010). In the United States, CDAs have been proposed at the federal level, particularly through the America Saving for Personal Investment, Retirement, and Education (ASPIRE) Act (Cramer and Newville, 2009). Sherraden and others (Boshara, 2007; Sherraden and Stevens, 2010) have advocated for a CDA policy that is both universal and progressive: Their vision is for a national CDA program that automatically opens a savings account on behalf of every child born in the US and offers additional saving incentives to low- and moderate-income families.

SEED for Oklahoma Kids (SEED OK) is a policy experiment. The overall purpose of the experiment is to test a universal and progressive policy of lifelong asset building beginning at birth. For every child in the treatment group, SEED OK opened an Oklahoma College Savings Plan account and "seeded" it with $1,000. For about four years, low- and moderate-income treatment families were eligible for additional incentives, in the form of saving matches. In terms of study design, SEED OK is a randomized experiment with a probability sample. The sampling frame was birth records of every child born in Oklahoma during certain periods in 2007, with oversampling of African Americans, American Indians, and Hispanics. Because study participants were randomly assigned to treatment and control groups, SEED OK created a condition ideal for estimating intervention effects.

Nam et al. (in press) examine the impact of the SEED OK intervention on several early savings outcomes and find that the initiative increased 529 account holding, individual 529 savings, and total 529 assets. However, these authors do not examine in detail whether the treatment had different effects for subgroups with different demographic characteristics. In the research described here, we ask whether early SEED OK savings outcomes vary by socioeconomic status (SES) and whether the impact of the intervention varies by SES.

It is important to examine the relationship between SES and savings outcomes in SEED OK for several reasons. First, in the current social, economic, and policy environment, patterns of asset ownership and asset accumulation vary markedly by SES. Higher-income households are much more likely than lower-income households to own a variety of assets, and net worth is much greater for higher-income households than for lower-income households. There is also extreme asset inequality by race and ethnicity.[2]

[1] Throughout, we use the term "college" to refer to college and other forms of accredited postsecondary education and training.

[2] For example, in 2004, in the highest (lowest) income quintile, 89% (44%) of households owned a home, 88% (39%) held interest-earning assets at a financial institution, 74% (7%) had a 401(k) retirement savings plan or Thrift Savings Plan, 55% (10%) owned an Individual Retirement Account (IRA) or Keogh account, and 52% (10%) owned stocks or mutual fund shares (U.S. Census Bureau, 2010b). Median net worth was over $294,000 for households in the highest income quintile, and less than $6,300 for households in the lowest income quintile (U.S. Census Bureau, 2010a). In

Second, low-SES individuals and households have been less likely to participate in existing programs designed to support asset building and have saved less, on average, in these programs. These patterns hold for 529 plans (Dynarski, 2004); for voluntary and incentivized retirement saving programs, such as IRAs and 401(k)s (Springstead and Wilson, 2000; Madrian and Shea, 2001); and even for Individual Development Accounts (IDAs), which are subsidized savings accounts for low-income people (Zhan and Schreiner, 2005; Grinstein-Weiss and Sherraden, 2006; Grinstein-Weiss et al., 2007; Schreiner and Sherraden, 2007).[3]

Third, the SEED OK intervention differs from the major asset-building programs—e.g., IRAs, 401(k)s, and traditional 529 plans—in important ways. It is grounded in an institutional theory of saving which has identified policy and program characteristics that likely encourage (or discourage) saving (Sherraden et al., 2003; Sherraden and Barr, 2005; Schreiner and Sherraden, 2007; Beverly et al., 2008). Thus, it includes universal components (automatic account opening and automatic initial deposits) and progressive components (incentives that aim to subsidize as well as incentivize saving by lower-income households). Through these universal and progressive components, SEED OK intentionally attempts to remove common barriers to account holding, saving, and asset accumulation by low-SES households. To fully assess the SEED OK intervention, it is necessary to document SEED OK savings outcomes for low-SES subgroups and the impact of SEED OK on low-SES subgroups.

SEED OK

SEED OK uses the Oklahoma College Savings Plan (OK 529), an existing state-sponsored 529 education savings plan. Like other 529 plans, the OK 529 provides tax incentives for college savings. Investments in the OK 529 grow tax-free if used for qualified education expenses, and contributions up to $10,000 per year ($20,000 for couples filing jointly) may be deducted from state income taxes. Money in OK 529 accounts may be used at eligible educational institutions, both in-state and out-of-state.[4] Non-qualified withdrawals of investment earnings (but not contributions) are subject to federal and state taxes and an additional 10% federal tax (Oklahoma 529 College Savings Plan, 2010).

At the beginning of the study, SEED OK randomly selected a sample of children born in 2007. The primary caregivers (mostly mothers)[5] of these "SEED OK children" were invited by letter to participate in the SEED OK study. The invitation letter informed mothers that their children had a 50–50 chance of receiving an OK 529 account with a $1,000 initial deposit if they participated in the study. After the baseline telephone survey, SEED OK randomly assigned survey respondents to the

2009, 24% of Hispanic households and 24% of Black households had no assets other than a vehicle, compared to 6% of White households. Median net worth for White households was 18 times that of Hispanic households and 20 times that of Black households (Taylor, Fry, & Kochhar, 2011). For additional statistics on asset holding by income, race/ethnicity, and education, see Carraso & McKernan (2008).

[3] The most rigorous examinations of IDAs use data from the American Dream Demonstration (ADD). None of the ADD participants could be characterized as high-SES, but within the low-to-moderate income sample, indicators of SES varied. Subgroups with some socioeconomic advantages—e.g., Whites, married individuals, home owners, those with bank accounts, and those with more education—tended to save more in IDAs (Zhan & Schreiner, 2005; Grinstein-Weiss & Sherraden, 2006; Grinstein-Weiss, Irish, Parish, & Wagner, 2007; Schreiner & Sherraden, 2007).

[4] Eligible institutions include public and private colleges and universities, graduate and post-graduate schools, community colleges, and vocational schools.

[5] For simplicity, we refer to "mothers" from this point on.

treatment or control group. Mothers in the treatment group received an incentive package designed to encourage them to open their own OK 529 account and to begin saving for their child's postsecondary education (Zager et al., 2010).

For simplicity and efficiency, the ideal CDA policy would have a single account structure. If the policy vehicle were a college savings plan, each participant could have a single 529 account, holding all deposits and earnings from all sources. However, as an artifact of existing state policy, a single OK 529 account structure was not possible for the SEED OK experiment.[6] Instead, the SEED OK treatment involves two different types of OK 529 accounts, state-owned and participant-owned. Specifically,

1. A state-owned OK 529 account was automatically opened for every treatment child, unless caregivers declined this account by notifying the State of Oklahoma;

2. A $1,000 initial deposit was automatically deposited into each state-owned OK 529 account;

3. Mothers in the treatment group were sent information about the OK 529 plan and encouraged to open their own (private, not state-owned) OK 529 account with the child as beneficiary;[7]

4. Mothers in the treatment group who opened their own "participant-owned" OK 529 account by April 15, 2009 received a $100 account-opening incentive;[8] and

5. For income-eligible mothers in the treatment group, deposits into participant-owned OK 529 accounts earned matching deposits. Through the end of 2011, SEED OK provided a 1:1 match to savings by treatment participants whose annual adjusted gross income (AGI) was below $29,000 and a 0.5:1 match for those with an AGI from $29,000 to $43,499.[9] Matches were deposited in the state-owned OK 529 account.

Mothers in the control group did not receive any information from SEED OK about the OK 529, were not eligible for the state-owned OK 529 account, and were not offered any SEED OK

[6] For the SEED OK experiment, the State of Oklahoma preferred to retain ownership of the initial deposit and matching funds. Therefore, these contributions were made in state-owned OK 529 accounts, with the child named as beneficiary. In this way, access to SEED OK incentives in state-owned accounts is restricted for the intended purpose of postsecondary education. In addition, separating deposits made by treatment participants from those made by the State of Oklahoma prevents the state-owned accounts from jeopardizing families' eligibility for federal financial aid for college or other public benefits. If a CDA policy were available to all Oklahoma residents, the OK 529 plan structure could be changed to separate state-owned assets from deposits made by families via separate investment portfolios in a single account.

[7] SEED OK information was provided in Spanish to participants who indicated in the survey that Spanish was their primary language.

[8] The OK 529 plan requires a $100 minimum initial contribution to open a new account. To remove any financial barriers to account opening, SEED OK deposited the required $100 initial contribution for treatment participants who opened an account by April 15, 2009. Treatment participants opening accounts after that date must deposit the $100 themselves.

[9] Those who received public assistance (Temporary Assistance for Needy Families, Supplemental Nutrition Assistance Program, and Medicaid) were also eligible for the 1:1 match. This provision allows people who don't file state income tax returns to receive the match (Zager, Kim, Nam, Clancy, & Sherraden, 2010).

financial incentives. However, they could open their own "participant-owned" OK 529 accounts, just as any non-study participant can (Zager et al., 2010).

In addition to these state-owned and participant-owned OK 529 accounts, SEED OK research examines a third type of OK 529 account, those opened for SEED OK children by adults other than mothers (e.g., fathers, grandparents, family friends). These other private accounts could be opened for both treatment and control group children. SEED OK did not provide any incentives or information specifically for owners of these other OK 529 accounts. We examine these accounts because they have the same beneficiaries as the state-owned and participant-owned accounts. It seems likely that adults consider these "other" accounts when making decisions about saving in state-owned and participant-owned accounts and *vice versa*.

The SEED OK account structure and treatment are summarized in Table 1. By randomly assigning study participants to treatment and control groups, the SEED OK experiment aimed to generate a condition where variation in access to an intervention (SEED OK incentives and information) was the only systematic difference between the treatment and control groups. Because random assignment appears to have been successful,[10] we attribute differences in outcomes to the SEED OK intervention, not to individual, environmental, or other characteristics that may be associated with study participants.

Table 1. SEED OK 529 Account Structure and Incentives, by Treatment Status

	Treatment	Control
State-owned 529 Account	• State-owned OK 529 account opened automatically for child with $1,000 initial deposit (unless parent opts out).	• No state-owned OK 529 account for child.
Participant-owned 529 Account	• Participant-owned OK 529 account opening encouraged. • Time-limited $100 account-opening incentive offered. • Saving in own account is matched, if income-eligible. (Match money is deposited in state-owned account.)	• Participant-owned OK 529 account may be opened. • No SEED OK information or account-opening incentive. • No SEED OK savings match.
Other Private 529 Account	• Anyone may open other private OK 529 accounts for child. • No SEED OK incentives.	• Anyone may open other private OK 529 accounts for child. • No SEED OK incentives.

[10] Kim & Nam (2009) examined whether children in the treatment group differed from children in the control group on 36 baseline demographic, household, and economic characteristics. No differences were statistically significant at the .05 level. Of course, members of the treatment and control groups may differ on unobserved characteristics.

Research Objectives

The purpose of this research is to document early SEED OK savings outcomes for diverse SES subgroups and to examine whether the early impacts of SEED OK vary by SES. In this section, we describe the outcomes of interest and the logic of the impact assessment.

Early savings outcomes

OK 529 account data come from 2008–2010, when SEED OK children were younger than four years old. Thus, we examine *early* outcomes and the *early* impact of SEED OK. Future research will examine the impact of SEED OK on parental attitudes and behaviors and on later outcomes for children.

Our first set of outcomes measures 529 account holding, i.e., whether a SEED OK child is the beneficiary of an OK 529 account. Under the CDA model advocated by Sherraden and others (Boshara, 2007; Sherraden and Stevens, 2010), CDAs would be opened automatically for every child, at birth. In this scenario, the question of account holding would be moot. For now, however, account holding is a useful outcome measure. First, actively opening a 529 account shows that adults are interested in planning for college expenses, and in fact are motivated enough to overcome the inertia or "status quo bias" that often causes people to postpone financial decision-making.[11] Second, once families have a 529 account—whether they opened this account themselves or received an automatically opened state-owned account—they have a vehicle for college saving that is tax-favored and "labeled" (e.g., "Tanya's college account"). Having a labeled account may encourage saving by making the goal—financing college—more salient. These 529 accounts also come with quarterly account statements, which might be viewed as regular, albeit subtle, reminders to save.[12] Third, opening or receiving a 529 account when a child is young allows more time for individuals to make deposits and for assets to accumulate.

Our second set of outcomes measures individual savings in OK 529 accounts for SEED OK children, that is, deposits made by individuals, not including any SEED OK incentives. We recognize that low-SES households have less money to put toward college saving than high-SES households, and this limits the ability of any asset-building effort to increase saving by low-SES households. Still, as a universal and progressive initiative, the SEED OK treatment intentionally attempts to increase account holding, saving, and asset accumulation for college among less-advantaged households, so it is important to examine how different SES subgroups respond to SEED OK information and incentives. Also, in the long run (depending on the level of incentives or subsidies), individual savings could make up the bulk of asset accumulation in CDAs.

Our final set of outcomes measures total 529 assets, that is, all money in OK 529 accounts, including deposits made by individuals and any SEED OK incentives given to members of the treatment group. For many purposes, this is the most useful measure of the impact of SEED OK. For example, total 529 assets will be more related to adequacy of funds to finance college than individual savings alone. In addition, because SEED OK is intentionally progressive, with saving matches that aim to subsidize as well as incentivize saving by lower-income households, an analysis

[11] For more on inertia, see Benartzi and Thaler (2004) and Madrian and Shea (2001).
[12] Treatment children receive quarterly statements for state-owned accounts, even though these accounts were opened automatically. For more on account labels and reminders to save, see Karlan et al. (2010).

that examined only individual savings would be incomplete. Finally, there is growing evidence that financial assets in a household, controlling for other observed variables, are associated with educational outcomes (see Williams Shanks et al., 2010 for a review).

It is important to note that we do not measure any reshuffling of assets between other saving vehicles and OK 529 accounts. We measure saving and asset accumulation *in Oklahoma 529 accounts only*. At this stage in SEED OK, we do not have data on changes in other assets and liabilities in the household and, therefore, we are not able to conduct an impact test on net worth. As a result, we do not know whether deposits in OK 529 accounts are "new" savings or are simply shifted from other saving vehicles.

Logic of SEED OK impact assessment

SEED OK creates the essential experimental conditions for an impact assessment and policy test. Any member of the control group may open and deposit into an OK 529 account. Thus, members of the control group have the same access to 529 accounts as members of the treatment group. What they do not have, by design, are the same incentives and institutional assistance offered to the treatment group—because this is the policy test. The treatment following random assignment is automatic 529 account opening with deposit, unless rejected, plus saving matches. This is not the same as holding a 529 account and having money in it at a later point in time. The latter are *outcomes*, and the impact of SEED OK on these outcomes can and should be measured. Even holding a state-owned account and having money in it at a later point in time are experimental outcomes that should be measured. It does not matter that members of the treatment group did not have to "do" anything to achieve these outcomes. The SEED OK treatment is paternalistic, but other public policies—e.g., Social Security—are also quite paternalistic, and for these we can and do measure later outcomes, when these represent policy goals.

As stated above, the main purpose of SEED OK is a policy test for universal and progressive policy for account holding, long-term asset accumulation, and later developmental outcomes. It is not simply a test of whether people open their own 529 accounts and deposit their own money. Individual behavior alone can never result in universal and progressive asset accumulation. Therefore, SEED OK does not focus on individual behavior alone, or even primarily. If 529 account holding is a potential policy goal, then we should measure the impact of SEED OK on 529 account holding. If the accumulation of 529 assets is a potential policy goal, then we should measure the impact of SEED OK on total 529 assets. Future SEED OK research can examine whether having 529 accounts and assets—regardless of who opened accounts and deposited money—positively affects children's development, educational attainment, and other outcomes.

Methods

Sample

The sampling frame for the SEED OK experiment was all children born in Oklahoma in two three-month periods (April through June and August through October, 2007). Data came from birth records, and children were randomly selected from the sampling frame. Three minority groups (African Americans, American Indians, and Hispanics) were oversampled, using a stratified random sampling method, to increase statistical power for subgroup analyses. Caregivers of 7,115 children

were invited to participate in the SEED OK study. Of these, 2,704 completed the baseline telephone survey, yielding a response rate of 38%. This response rate is not abnormally low for a telephone survey.[13] Still, the study participants may differ from nonparticipants because they were located by the survey research firm, were willing to provide their child's Social Security Number (which was required to automatically open the state-owned account), and completed the telephone survey.[14]

To assess bias due to nonparticipation, we used information from birth records (the sampling frame) to compare characteristics of participants and nonparticipants. SEED OK participants are not significantly different from nonparticipants in terms of race and Hispanic origin, gender, and birth-weight of the child; mother's marital status and metropolitan residency; and father's age. The mean values for SEED OK participants are significantly higher than mean values for nonparticipants for mother's age (25.5 versus 25.2 years) and mother's education (12.5 versus 12.2 years). In addition, participants were more likely than nonparticipants to be born in the US (87% versus 84%). It is possible, of course, that participants differ systematically from nonparticipants in unobserved characteristics (i.e., information not included in birth records). All analyses reported here use a weight variable created to adjust for oversampling of minority groups and observed nonparticipation bias. Weighting is a commonly used post-survey adjustment for nonparticipation (Groves, 2006).

From the 2,704 study participants, we excluded one mother whose child died during the data collection period and five primary caregivers who are not parents of SEED OK children (i.e., grandparents or siblings of children), because non-parent guardians' ability and willingness to save for SEED OK children may differ from those of parents. The full sample consists of 2,698 mothers, including 1,353 in the treatment group and 1,345 in the control group.

Data

This study uses data from three sources: 1) birth records; 2) the baseline survey; and 3) OK 529 account records. Official state birth records contain demographic information collected shortly after the birth of a child. Baseline survey data include detailed demographic, socioeconomic, and family characteristics. The baseline survey was conducted from fall 2007 though spring 2008 (Marks et al., 2008). These telephone surveys took, on average, 43 minutes, and participants were paid $40 for their time. Third, account data were provided to CSD each quarter by the OK 529 plan through an agreement with the OK 529 Board. The account data contain information such as account balance; quarter-to-date, year-to-date, and life-to-date deposits and withdrawals; and owner relationship to beneficiary for every OK 529 account that lists a SEED OK child as the beneficiary. This study uses account data for the period from January 1, 2008 through September 30, 2010.

[13] For example, the response rate for the Survey of Consumer Attitudes declined from 72% in 1979 to 48% in 2003 (Curtin et al., 2005). National surveys conducted by the Pew Research Center's achieved response rates of around 25% in 2003, compared to 36% in 1997 (Keeter et al., 2006).

[14] The second sample of children—those born between August and October 2007—was necessary because of a low study participation rate in the first sample.

Variables

Dependent variables

From data provided by the OK 529 plan, we created several dependent variables that capture 529 account holding, individual 529 savings, and total 529 assets. These variables are summarized in Table 2. For 529 account holding and individual 529 savings, we have measures that refer only to participant-owned 529 accounts (that is, accounts opened and owned *by SEED OK study participants* with the SEED OK child named as beneficiary) and measures that refer to any private 529 account (including participant-owned accounts and other private 529 accounts with the SEED OK child listed as account beneficiary). These "other private" accounts were opened for a SEED OK child by family members or friends presumably interested in the child's postsecondary education. As discussed above, both accounts are available to both treatment and control children; SEED OK encouraged mothers in the treatment group to open and save in participant-owned accounts, by providing information and incentives.

Table 2. Definitions of Early SEED OK Savings Outcomes

Early Savings Outcome	Definition
529 Account Holding	
529 Account Holding: Participant-Owned Account	Equals "1" if a SEED OK study participant owns an OK 529 account with the SEED OK child as beneficiary
529 Account Holding: Any Private Account	Equals "1" if either a participant-owned account or another private OK 529 account is open with the SEED OK child as beneficiary
529 Account Holding: Any Account	Equals "1" if any OK 529 account is open with the SEED OK child as beneficiary. (Includes participant-owned, other private, and state-owned OK 529 accounts)
Individual 529 Savings	
Any Individual 529 Savings: Participant-Owned Account	Equals "1" if net deposits into participant-owned account are greater than zero
Individual 529 Savings Amount: Participant-Owned Account	Equals the dollar value of net deposits into participant-owned account
Any Individual 529 Savings: Any Private Account	Equals "1" if net deposits across both participant-owned and other private OK 529 accounts are greater than zero
Individual 529 Savings Amount: Any Private Account	Equals the dollar value of net deposits across both participant-owned and other private OK 529 accounts
Total 529 Assets	
Any 529 Assets	Equals "1" if the sum of net deposits across both participant-owned and other private OK 529 accounts and the value of any SEED OK incentives is greater than zero
Total 529 Assets	Equals the sum of net deposits across both participant-owned and other private OK 529 accounts, plus the value of any SEED OK incentives

Notes: SEED OK incentives include the $1,000 initial deposit (automatically deposited into every state-owned OK 529 account), the $100 account-opening incentive (automatically deposited into every participant-owned account with a SEED OK child as beneficiary), plus any match earned by income-eligible members of the treatment group. The data collection period was January 1, 2008 to September 30, 2010.

The measures which combine participant-owned and other private 529 accounts are useful because they acknowledge that extended family members and friends may be saving for a child—i.e., that there are other paths to preparing for college expenses than saving by (very new) parents. In addition, the combined measures help us avoid overestimating treatment effects. SEED OK creates incentives for mothers in the treatment group to open *participant-owned* accounts. Thus, when a mother in the treatment group and her extended family members are motivated and able to save for a child's college expenses, they are likely to open and save in the *participant-owned* account. A mother in the control group does not have the same incentives, so when she and her extended family are motivated and able to save for college, someone other than the mother may open an OK 529 account. By combining accounts, we capture OK 529 account holding and saving both in and outside the participant-owned account. Parents and others may also choose to save for the SEED OK child outside the OK 529, e.g., in another state's 529 plan or in some other saving vehicle. Again, because we have data only from OK 529 accounts, we do not capture any other saving for college. The estimated effect of the SEED OK intervention would likely be weaker if we measured all college savings, not just OK 529 savings. The effect of this bias depends, of course, on how much saving for college occurs outside of the OK 529 plan.

The rest of the measures refer to *any* OK 529 account, including participant-owned, other private, and state-owned accounts.

529 account holding. Account holding is measured as of September 30, 2010, when children were about three years old. As discussed above, at this early point in time, simply having a 529 account is a non-trivial outcome, an important first step toward saving for college.

Individual 529 savings. Individual 529 savings comes from deposits to OK 529 accounts made by parents, other family members, and friends, and *not* deposits made by SEED OK. Individual savings is net deposits (that is, deposits minus withdrawals) between January 1, 2008 (the start of the first quarter of SEED OK) and September 30, 2010 (the last day of the observation period). Savings equals zero for sample members without OK 529 accounts. We report average individual 529 savings amounts for each SES subgroup. Because averages are heavily influenced by extreme values, we also examine a dichotomous measure, whether or not a SEED OK child has any individual 529 savings in her name. For each SES subgroup, we report the percentage with any individual 529 savings.

Total 529 assets. Total 529 assets include net deposits made by parents, other family members, and friends to private OK 529 accounts *and* SEED OK incentives deposited between January 1, 2008 and September 30, 2010. SEED OK incentives include the $1,000 initial deposit (automatically deposited into every state-owned account), the $100 account-opening incentive (automatically deposited into every participant-owned account with a SEED OK child as beneficiary), plus any match earned by income-eligible members of the treatment group. Total assets equals zero for sample members without OK 529 accounts. Again, we examine average total 529 savings amounts and whether or not a SEED OK child has any 529 assets in her name.

SES indicators

We examine two of the most common indicators of SES—income and education—as well as several less common measures. We selected indicators of SES that we expect may be correlated with

policy-relevant responsiveness to the SEED OK treatment. Unless otherwise noted, data for the SES indicators come from the baseline survey conducted before mothers were assigned to treatment and control groups.

Household income. Our measure of household income is an income/poverty ratio. Income is self-reported pre-tax income for the 12 months prior to the baseline survey. We created an income/poverty ratio by dividing household income by the appropriate 2008 federal poverty guideline.[15] We then divided the sample into three income/poverty groups: low-income (below 200% of the federal poverty guideline), middle-income (200% to below 400% of poverty), high-income (at or above 400% of poverty).

Parent education. Our measure of education captures the highest level of education across mother and her partner (if present). There are three categories: less than high school, high school graduate, and Bachelor's degree or more.

Child race/ethnicity. We believe that race/ethnicity is a key measure of social and economic status. Due to long histories of exclusion and on-going discrimination, the resources, institutions, and networks available to racial and ethnic minorities may differ substantially from those available to others, in ways not captured by income and education. Our data measure the SEED OK child's race/ethnicity and come from birth records. We use four categories: non-Hispanic White, non-Hispanic African-American; non-Hispanic American Indian, and Hispanic. In addition, our sample includes 15 Asians in the treatment group and 11 in the control group. We do not expect these small samples to be representative of the larger population of Asians in Oklahoma, so we do not examine outcomes separately for Asians.[16]

Banked status. Our measure of banked status indicates whether a household has either a checking or savings account. Having a basic bank account is a fundamental indicator of connectedness to mainstream financial institutions and is almost certainly a prerequisite for ownership of more sophisticated financial products.

Home ownership. A number of scholars have argued that wealth is an important indicator of SES. Wealth can vary widely across different social groups with similar income levels (Blau and Graham, 1990; Smith, 1995; Braveman et al., 2005). Wealth may often be a more accurate barometer of access to opportunities than income (Williams and Collins, 1995; Ostrove et al., 1999; Oliver and Shapiro, 2006). In addition, wealth tends to be less volatile than income, and some (Hauser, 1994) have argued that SES is best measured by characteristics that do not vary much over the short-term. Our measure of wealth captures home ownership, a form of non-liquid assets. Home ownership has occasionally been used as an indicator of SES (e.g., Grundy and Holt, 2001; Wardle et al., 2002). Our measure divides households into two categories: those that own, and those that rent or have other arrangements. Home owners may be more willing than renters to save for their child's college education because they do not need to save for home purchase. Home owners may also have greater financial knowledge and management skills because they have already saved successfully to purchase a home.

[15] Poverty guidelines are available at aspe.hhs.gov/poverty/08poverty.shtml.
[16] Asians are not excluded from the sample; they are included in all analyses except those for separate race/ethnicity subgroups.

Public assistance. Our measure of public assistance indicates whether a household received benefits from any of the following programs in the 12 months before the baseline survey: Temporary Assistance for Needy Families (TANF); Supplemental Nutrition Assistance Program (SNAP); and Supplemental Security Income (SSI) or Social Security Disability Insurance (SSDI). Most of these programs are means-tested, so receiving benefits reveals limited economic resources.

Primary language. This measure indicates whether English is the primary language spoken in the home. Households with a primary language other than English may have less access to information about 529 accounts. They may have less family experience with postsecondary education and so may be less motivated to save for this purpose. And, if permanent residence in the US is not assured, these households may not want to save in 529 accounts. Spanish is spoken in 88% of the homes with primary languages other than English.

Statistical approach

The goal of this research is to examine early SEED OK savings outcomes for different socioeconomic subgroups. The subgroups are defined by the SES indicators described above.[17] In particular, we ask whether early SEED OK outcomes vary significantly across socioeconomic subgroups and whether the *impacts* of SEED OK vary across socioeconomic subgroups.

To answer the first question, we compare across SES subgroups. We examine treatment and control groups separately because the associations between SES and savings outcomes may differ by treatment status. For the second question, we examine differences in savings outcomes between treatment and control groups, for separate socioeconomic subgroups.

Because the sample was randomly assigned to treatment and control groups, bivariate treatment-control comparisons reveal the impact of SEED OK on savings outcomes. Bivariate results are particularly useful because SEED OK explicitly aims to increase 529 asset holding, saving, and asset accumulation by low-income households and other disadvantaged households. It is impossible to evaluate fully the effectiveness of SEED OK without examining outcomes for these subgroups. Differences in percentages and means are compared using chi-square tests of independence and t-tests for independent samples. We examine all of the early savings outcomes defined in Table 2.[18] As noted above, all analyses use weighted data in order to take into account oversampling of minority groups and observed bias created by the fact that only 38% of those invited to participate in SEED OK did so (Marks et al., 2008).

In addition, for some of our savings outcomes, we examine the second research question in more detail. For outcomes that are percentages (i.e., percentage of SES subgroup with account; percentage with any individual savings; percentage with any assets), we use two simple computations to compare the impact of SEED OK across SES subgroups.[19] (These computations are described in

[17] We also examined subgroups defined by four other SES variables: ownership of financial assets, ownership of major credit card, caregiver's health insurance status, and internet access at home. Findings were very similar to the findings reported here, in terms of direction and statistical significance.

[18] We also examined savings rates, that is, individual 529 savings divided by annual household income. Findings for savings rates were similar to findings for individual 529 savings amounts.

[19] We do not use these computations for outcomes that are averages (i.e., mean savings amount; mean asset amount) because we believe that mean values are unduly influenced by a small number of high savers.

detail in Section 5.2, using data to illustrate.) The first computation compares percentage-point differences (Treatment minus Control) and gives equal weight to improvement by all subgroups, regardless of starting point. The second computation compares ratios (Treatment divided by Control) and gives greater weight to improvement by subgroups with less favorable outcomes in the absence of SEED OK. Because disadvantaged subgroups have less favorable outcomes without SEED OK, improvement by these groups is given greater weight. This weighting may be particularly useful for evaluating SEED OK, which explicitly aims to improve outcomes for disadvantaged groups.

Results

Sample characteristics

Table 3 presents socioeconomic characteristics of the sample. Over two-thirds of the sample is low-income, that is, has household income below 200% of the federal poverty guideline. Less than one-fourth of the households have a parent with a Bachelor's degree or more. Almost two-thirds of the children are non-Hispanic White, and English is the primary language in 90% of homes. Most households (79%) have a checking or savings account, but less than half own their own homes (42%). About two-fifths of households receive public assistance. No difference between treatment and control groups is statistically significant at the .05 level.

Table 3. Sample Characteristics, by Treatment Status (Weighted Percentages)

	Full Sample (N=2,698)	Control (n=1,345)	Treatment (n=1,353)
Income/poverty ratio[a]			
High-income	12.4%	12.4%	12.5%
Middle-income	18.3	18.2	18.3
Low-income	69.3	69.5	69.1
Parent education			
Bachelor's degree or more	23.4	22.5	24.3
High school graduate	57.8	59.5	56.1
Less than high school	18.8	18.0	19.6
Child race/ethnicity			
Non-Hispanic White	65.3	65.2	65.5
African American	8.9	9.0	8.9
American Indian	11.4	11.4	11.4
Asian	1.3	1.4	1.2
Hispanic	13.1	13.1	13.1
Banked			
Yes	79.1	79.3	78.9
No	20.9	20.7	21.1
Home ownership			
Own	41.9	41.9	41.9
Rent or other	58.1	58.1	58.1
Public assistance[b]			
No	59.2	58.6	59.7
Yes	40.8	41.4	40.3
Primary language			
English	90.4	90.0	91.0
Other	9.6	10.1	9.1

Source: SEED OK baseline survey and 2007 Oklahoma state birth records

Notes: Percentages may not sum to 100% due to rounding. The following variables have missing data: income-poverty (missing for 87 cases), parent education (1), banked status (11), home ownership (5), and public assistance (11). No treatment-control difference is statistically significant at the .05 level.

[a] "Low-income" = below 200% of the federal poverty guideline. "Middle-income" = 200% to below 400% of poverty. "High-income" = at or above 400% of poverty.

[b] Public assistance includes TANF, SSI/SSDI, and SNAP.

529 account holding

Tables 4, 5, and 6 show results for 529 account holding, first for participant-owned OK 529 accounts, then for any private OK 529 account, and finally for any OK 529 account (including state-owned and any private accounts). The first two columns of these tables show the percentage of children in the control and treatment groups who are beneficiaries of an account. The third and fourth columns show the difference between treatment and control groups and the probability value associated with this difference. The probability values in the rows labeled "p-value (across SES)" show whether account-holding rates vary significantly across SES subgroups. A number of p-values are not available (noted "n.a." in the tables). For these comparisons, chi-square tests are not valid due to a large proportion of small expected cell counts.[20] The first columns in Tables 5 and 6 are identical because children in the control group are not eligible for state-owned accounts. Some of the values in Column 2 of Table 6 are less than 100% because one mother opted out of the state-owned 529 account for her child, for religious reasons.

Tables 4, 5, and 6 reveal several noteworthy findings. First, at this early point in life, without SEED OK, it is rare for a child to have a 529 account. Less than 3% of children in the control group have an OK 529 account in their name (Table 6, Column 1). Second, for private accounts that must be opened by individuals, account holding is usually greater for advantaged subgroups than for disadvantaged subgroups (Tables 4 and 5, Columns 1 and 2).[21] Third, private account holding is greater for the treatment group than for the control group (Tables 4 and 5, Columns 3 and 4). The pattern is that SEED OK increases account holding—even for accounts that must be actively opened by individuals—for a diverse set of SES subgroups. Taken together, the second and third patterns mean that account-holding rates for private accounts are particularly low for disadvantaged subgroups in the control group. For some of these subgroups, account-holding rates are zero.

Fourth, for the holding of any 529 account, which includes state-owned accounts, there is noticeable variation by SES in the control group (Table 6, Column 1), but virtually no variation by SES in the treatment group (Column 2). By design, all children in the treatment group (except the child whose mother opted out) have some 529 account. Not surprisingly, the difference between treatment and control groups is highly significant for every SES subgroup (Column 4).

The statistics in Tables 4, 5, and 6 clearly show that SEED OK increased 529 account holding for diverse SES subgroups. To examine whether the impact of SEED OK is greater for low-SES or high-SES subgroups, we use two computations. The first computation (shown in Column 3) calculates the percentage-point difference in outcomes between treatment and control groups. We calculate this difference for each SES subgroup and then ask whether the percentage-point difference is greater for the high-SES group or the low-SES group. For example, in Table 4, for those who did not receive public assistance (the high-SES subgroup), the difference between the percentage holding participant-owned accounts in the treatment group and the percentage holding participant-owned accounts in the control group is 19.8 percentage points. For those who did

[20] The small expected cell counts are usually caused by one of the following: 1) the fact that zero or very few members of the control group have accounts; or 2) for outcomes involving *any* account, the fact that a cell with 100% has a corresponding cell with 0% (not shown in the table). We cannot use Fisher's exact test as an alternative because weighting the data creates non-integer frequencies.

[21] There is one exception to the pattern: Among controls, those whose primary language is English are *less* likely to have a participant-owned account than those with "other" primary languages, but we cannot test for significance.

receive public assistance, the difference between the percentage holding participant-owned accounts in the treatment group and the percentage holding participant-owned accounts in the control group is 9.4 percentage points. The percentage-point difference is larger for those who did not receive assistance, indicating that SEED OK has a greater impact on the high-SES subgroup. The percentage-point computation assumes that SEED OK has a greater impact when the proportion of people holding accounts increases more, regardless of account-holding rates in the absence of SEED OK. In other words, as noted above, this computation gives equal weight to improvement by all socioeconomic subgroups.

The second computation (shown in Column 5) uses the same percentages, but calculates a ratio (Treatment divided by Control). We calculate this ratio for each SES subgroup and then ask whether the ratio is greater for the high-SES group or the low-SES group. For example, the ratio for those who did not receive public assistance is 15.1; the ratio for those who did receive public assistance is 48.0. The ratio is larger for those who received public assistance, indicating that SEED OK has a larger impact on the low-SES subgroup. The ratio computation is undefined when there is a zero in the denominator, e.g., when no mothers in the control group have an account. As noted above, this computation gives greater weight to improvement by subgroups with less favorable outcomes in the absence of SEED OK.

What do percentage-point and ratio computations show about the relative impact of SEED OK on 529 account holding for different SES subgroups? For participant-owned and any private accounts (i.e., accounts that must be opened by individuals), the percentage-point computation shows that SEED OK has a greater impact on high-SES subgroups. Findings from the ratio computation are less straightforward. For participant-owned accounts (Table 4), the ratio computation shows that SEED OK has a greater impact on low-SES subgroups when SES is measured by income and public assistance, and a greater impact on high-SES subgroups when SES is measured by race, home ownership, and primary language (though the difference between home owners and renters is small). For any private account (Table 5), the ratio computation shows that SEED OK has a greater impact on low-SES subgroups except when SES is measured by primary language. In sum, the overall patterns for accounts that must be opened by individuals are as follows: High-SES subgroups benefit more in terms of absolute increases in account-holding rates, but—with a few exceptions—low-SES subgroups benefit more when the comparison gives greater weight to subgroups with a less favorable starting point.

For any account (which includes the state-owned account automatically opened for treatment children), both computations reveal that SEED OK had a greater impact on low-SES subgroups.[22] This pattern occurs because low-SES subgroups are less likely to have accounts in the absence of SEED OK, so automatic account opening increases account holding more for these subgroups.

[22] There is one exception: The percentage-point difference for high school graduates was slightly higher than the percentage-point difference for those with less than a high school education (99.8 vs 99.7). This finding is sensitive to the fact that the mother who declined the state-owned account has less than a high school education.

Table 4. Percentage with Participant-Owned OK 529 Account, by Treatment Status and Socioeconomic Characteristic

	(1)	(2)	(3)	(4)	(5)
	Control	Treatment	Difference (T - C)	p-value (T-C)	Ratio (T/C)
Full Sample	0.9%	16.5%	15.6	<.01**	18.3
Income/poverty ratio[a]					
High-income	5.2	46.3	41.1	<.01**	8.9
Middle-income	1.3	22.4	21.1	<.01**	17.2
Low-income	0.1	10.3	10.2	<.01**	103.0
p-value (across SES)	n.a.	< .01**			
Parent education					
Bachelor's degree or more	4.0	39.1	35.1	<.01**	9.8
High school graduate	0.0	11.7	11.7	<.01**	n.a.
Less than high school	0.0	2.2	2.2	n.a.	n.a.
p-value (across SES)	n.a.	<.01**			
Child race/ethnicity					
Non-Hispanic White	1.2	20.7	19.5	<.01**	17.3
African American	0.0	10.1	10.1	<.01**	n.a.
American Indian	0.9	8.3	7.4	<.01**	9.2
Hispanic	0.0	5.7	5.7	n.a.	n.a.
p-value (across SES)	n.a.	<.01**			
Banked					
Yes	1.2	19.7	18.6	<.01**	16.5
No	0.0	4.8	4.8	<.01**	n.a.
p-value (across SES)	n.a.	<.01**			
Home ownership					
Own	1.5	27.1	25.6	<.01**	18.1
Rent or other	0.5	8.9	8.4	<.01**	17.8
p-value (across SES)	.06ǂ	<.01**			
Public assistance[b]					
No	1.4	21.2	19.8	<.01**	15.1
Yes	0.2	9.6	9.4	<.01**	48.0
p-value (across SES)	.02*	<.01**			
Primary language in home					
English	0.8	17.5	16.7	<.01**	21.9
Other	1.6	6.8	5.2	n.a.	4.3
p-value (across SES)	n.a.	<.01**			

Sources: SEED OK baseline survey and account monitoring data and 2007 Oklahoma state birth records
Note: Account holding is measured on September 30, 2010, when children were about three years old.
n.a. = not available. Some chi-square tests are not valid due to a large proportion of small expected cell counts. Some ratios cannot be computed due to a zero in the denominator.
ǂ p < .10; * p < .05; ** p < .01
[a] "Low-income" = below 200% of the federal poverty guideline. "Middle-income" = 200% to below 400% of poverty. "High-income" = at or above 400% of poverty.
[b] Public assistance includes TANF, SSI/SSDI and SNAP.

Table 5. Percentage with Any Private OK 529 Account, by Treatment Status and Socioeconomic Characteristic

	(1)	(2)	(3)	(4)	(5)
	Control	Treatment	Difference (T - C)	p-value (T-C)	Ratio (T/C)
Full Sample	2.4%	17.3%	14.9	<.01**	7.2
Income/poverty ratio[a]					
High-income	14.9	49.8	34.9	<.01**	3.3
Middle-income	2.2	24.3	22.1	<.01**	11.0
Low-income	0.4	10.4	10.0	<.01**	26.0
p-value (across SES)	<.01**	<.01**			
Parent education					
Bachelor's degree or more	10.3	41.9	31.6	<.01**	4.1
High school graduate	0.2	12.1	11.9	<.01**	60.5
Less than high school	0.0	2.2	2.2	n.a.	n.a.
p-value (across SES)	<.01**	<.01**			
Child race/ethnicity					
Non-Hispanic White	3.4	21.7	18.3	<.01**	6.4
African American	0.0	10.9	10.9	<.01**	n.a.
American Indian	1.3	8.6	7.3	<.01**	6.6
Hispanic	0.8	6.6	5.8	<.01**	8.3
p-value (across SES)	n.a.	<.01**			
Banked					
Yes	3.1	20.8	17.7	<.01**	6.7
No	0.0	4.8	4.8	<.01**	n.a.
p-value (across SES)	<.01**	<.01**			
Home ownership					
Own	4.9	28.8	23.9	<.01**	5.9
Rent or other	0.7	9.1	8.4	<.01**	13.0
p-value (across SES)	<.01**	<.01**			
Public assistance[b]					
No	4.1	22.5	18.4	<.01**	5.5
Yes	0.2	9.9	9.7	<.01**	49.5
p-value (across SES)	<.01**	<.01**			
Primary language in home					
English	2.5	18.4	15.9	<.01**	7.4
Other	1.6	6.8	5.2	n.a.	4.3
p-value (across SES)	n.a.	<.01**			

Sources: SEED OK baseline survey and account monitoring data and 2007 Oklahoma state birth records
Note: Account holding is measured on September 30, 2010, when children were about three years old.
n.a. = not available. Some chi-square tests are not valid due to a large proportion of small expected cell counts. Some ratios cannot be computed due to a zero in the denominator.
ǂ $p < .10$; * $p < .05$; ** $p < .01$
[a] "Low-income" = below 200% of the federal poverty guideline. "Middle-income" = 200% to below 400% of poverty. "High-income" = at or above 400% of poverty.
[b] Public assistance includes TANF, SSI/SSDI and SNAP.

Table 6. Percentage with Any OK 529 Account, by Treatment Status and Socioeconomic Characteristic

	(1)	(2)	(3)	(4)	(5)
	Control	Treatment	Difference (T - C)	p-value (T-C)	Ratio (T/C)
Full Sample	2.4%	99.9%	97.5	<.01**	41.6
Income/poverty ratio[a]					
High-income	14.9	100.0	85.1	<.01**	6.7
Middle-income	2.2	100.0	97.8	<.01**	45.5
Low-income	0.4	99.9	99.5	<.01**	249.8
p-value (across SES)	<.01**	n.a.			
Parent education					
Bachelor's degree or more	10.3	100.0	89.7	<.01**	9.7
High school graduate	0.2	100.0	99.8	<.01**	500.0
Less than high school	0.0	99.7	99.7	<.01**	n.a.
p-value (across SES)	<.01**	n.a.			
Child race/ethnicity					
Non-Hispanic White	3.4	99.9	96.5	<.01**	29.4
African American	0.0	100.0	100.0	<.01**	n.a.
American Indian	1.3	100.0	98.7	<.01**	76.9
Hispanic	0.8	100.0	99.2	<.01**	125.0
p-value (across SES)	n.a.	n.a.			
Banked					
Yes	3.1	99.9	96.8	<.01**	32.2
No	0.0	100.0	100.0	<.01**	n.a.
p-value (across SES)	<.01**	n.a.			
Home ownership					
Own	4.9	99.9	95.0	<.01**	20.4
Rent or other	0.7	100.0	99.3	<.01**	142.9
p-value (across SES)	<.01**	n.a.			
Public assistance[b]					
No	4.1	99.9	95.8	<.01**	24.4
Yes	0.2	100.0	99.8	<.01**	500.0
p-value (across SES)	<.01**	n.a.			
Primary language in home					
English	2.5	99.9	97.4	<.01**	40.0
Other	1.6	100.0	98.4	<.01**	62.5
p-value (across SES)	n.a.	n.a.			

Sources: SEED OK baseline survey and account monitoring data and 2007 Oklahoma state birth records
Note: Account holding is measured on September 30, 2010, when children were about three years old.
n.a. = not available. Some chi-square tests are not valid due to a large proportion of small expected cell counts. Some ratios cannot be computed due to a zero in the denominator.
ǂ p < .10; * p < .05; ** p < .01
[a] "Low-income" = below 200% of the federal poverty guideline. "Middle-income" = 200% to below 400% of poverty. "High-income" = at or above 400% of poverty.
[b] Public assistance includes TANF, SSI/SSDI and SNAP.

Individual 529 savings

Table 7 shows the percentage of SEED OK children with any individual savings in their name, *in participant-owned accounts*. Individual savings comes from deposits made by parents, other family members, and friends. There are several findings to note. First, without SEED OK, most children have no 529 savings. Less than 1% of children in the control group have any 529 savings (Column 1). Second, the percentage of children with some individual 529 savings in their name is consistently higher for the treatment group than for the control group. All differences that can be examined with chi-square tests are significant at the .01 level (Column 4), indicating that SEED OK increases the likelihood that children have some college savings. Third, even with SEED OK, children in advantaged groups are more likely to have some savings in their name (Column 2).[23] The patterns revealed by the percentage-point and ratio computations for this outcome are similar to the patterns for 529 account holding: High-SES subgroups benefit more from SEED OK in terms of absolute increases in the likelihood of having any 529 savings, but ratios more often show that low-SES subgroups benefit more. Table 8 shows statistics related to individual 529 savings in *any private account*. For the most part, the patterns revealed in Table 8 are similar to those in Table 7. Most children have no 529 savings. The percentage of children with some individual 529 savings in their name is consistently higher for the treatment group than for the control group. All treatment-control differences that can be tested are significant at the .01 level. Even within the context of SEED OK, advantaged subgroups tend to have more favorable outcomes than disadvantaged subgroups. Again, high-SES subgroups benefit more from SEED OK in terms of absolute increases in the likelihood of having any 529 savings. Low-SES subgroups often benefit more when ratios are used to compare impact.

Next, we examine mean individual savings amounts in participant-owned accounts and in any private account (Table 9).[24] For both types of accounts, advantaged groups have more savings than disadvantaged groups, though differences by race/ethnicity are not significant. The mean value of individual 529 savings is consistently higher for the treatment group, but these differences are only sometimes significant. Mean savings amounts are imperfect measures in our sample because the distributions of the savings amount variables are very skewed. Most SEED OK children have no savings in their name, and a few have large amounts. The means reported here do not accurately represent college savings for the "typical" SEED OK child because the means are influenced by a small number of children with high savings. Also, large variances for savings amount variables decrease the likelihood that differences between treatment and control groups are statistically significant. Overall, the evidence is mixed regarding the impact of SEED OK on the value of individual savings within subgroups.

[23] The difference is not significant for primary language.
[24] All median values are zero.

Table 7. Percentage with Any Individual Savings in Participant-Owned OK 529 Account, by Treatment Status and Socioeconomic Characteristic

	(1)	(2)	(3)	(4)	(5)
	Control	Treatment	Difference (T - C)	p-value (T-C)	Ratio (T/C)
Full Sample	0.7%	7.4%	6.7	<.01**	10.6
Income/poverty ratio[a]					
High-income	4.8	28.0	23.2	<.01**	5.8
Middle-income	0.4	10.3	9.9	<.01**	25.8
Low-income	0.1	3.3	3.2	<.01**	33.0
p-value (across SES)	n.a.	<.01**			
Parent education					
Bachelor's degree or more	3.2	20.0	16.8	<.01**	6.3
High school graduate	0.0	4.6	4.6	<.01**	n.a.
Less than high school	0.0	0.2	0.2	n.a.	n.a.
p-value (across SES)	n.a.	<.01**			
Child race/ethnicity					
Non-Hispanic White	1.0	9.6	8.6	<.01**	9.6
African American	0.0	3.3	3.3	n.a.	n.a.
American Indian	0.6	3.1	2.5	n.a.	5.2
Hispanic	0.0	1.6	1.6	n.a.	n.a.
p-value (across SES)	n.a.	<.01**			
Banked					
Yes	0.9	9.3	8.4	<.01**	10.3
No	0.0	0.6	0.6	n.a.	n.a.
p-value (across SES)	n.a.	<.01**			
Home ownership					
Own	1.4	13.6	12.2	<.01**	9.7
Rent or other	0.2	3.0	2.8	<.01**	15.0
p-value (across SES)	n.a.	<.01**			
Public assistance[b]					
No	1.1	10.7	9.6	<.01**	9.7
Yes	0.2	2.7	2.5	<.01**	13.5
p-value (across SES)	n.a.	<.01**			
Primary language in home					
English	0.8	7.7	6.9	<.01**	9.6
Other	0.0	4.9	4.9	n.a.	n.a.
p-value (across SES)	n.a.	0.26			

Sources: SEED OK baseline survey and account monitoring data and 2007 Oklahoma state birth records
Note: "Individual savings" come from deposits made by parents, other family members, and friends. Amount equals deposits minus withdrawals between January 1, 2008 and September 30, 2010.
n.a. = not available. Some chi-square tests are not valid due to a large proportion of small expected cell counts. Some ratios cannot be computed due to a zero in the denominator.
ǂ $p < .10$; * $p < .05$; ** $p < .01$
[a] "Low-income" = below 200% of the federal poverty guideline. "Middle-income" = 200% to below 400% of poverty. "High-income" = at or above 400% of poverty.
[b] Public assistance includes TANF, SSI/SSDI, and SNAP.

Table 8. Percentage with Any Individual Savings in Any Private OK 529 Account, by Treatment Status and Socioeconomic Characteristic

	(1)	(2)	(3)	(4)	(5)
	Control	Treatment	Difference (T - C)	p-value (T-C)	Ratio (T/C)
Full Sample	2.1%	8.5%	6.4	<.01**	4.0
Income/poverty ratio[a]					
High-income	13.8	32.7	18.9	<.01**	2.4
Middle-income	1.3	12.2	10.9	<.01**	9.4
Low-income	0.4	3.5	3.1	<.01**	8.8
p-value (across SES)	<.01**	<.01**			
Parent education					
Bachelor's degree or more	9.0	23.4	14.4	<.01**	2.6
High school graduate	0.2	4.9	4.7	<.01**	24.5
Less than high school	0.0	0.2	0.2	n.a.	n.a.
p-value (across SES)	<.01**	<.01**			
Child race/ethnicity					
Non-Hispanic White	3.0	10.8	7.8	<.01**	3.6
African American	0.0	4.1	4.1	n.a.	n.a.
American Indian	0.9	3.4	2.5	n.a.	3.8
Hispanic	0.8	2.6	1.8	n.a.	3.3
p-value (across SES)	n.a.	<.01**			
Banked					
Yes	2.7	10.6	7.9	<.01**	3.9
No	0.0	0.6	0.6	n.a.	n.a.
p-value (across SES)	<.01**	<.01**			
Home ownership					
Own	4.5	15.7	11.2	<.01**	3.5
Rent or other	0.4	3.3	2.9	<.01**	8.3
p-value (across SES)	<.01**	<.01**			
Public assistance[b]					
No	3.5	12.2	8.7	<.01**	3.5
Yes	0.2	3.0	2.8	<.01**	15.0
p-value (across SES)	<.01**	<.01**			
Primary language in home					
English	2.4	8.8	6.4	<.01**	3.7
Other	0.0	5.0	5.0	n.a.	n.a.
p-value (across SES)	n.a.	0.14			

Sources: SEED OK baseline survey and account monitoring data and 2007 Oklahoma state birth records
Notes: "Individual savings" come from deposits made by parents, other family members, and friends. Amount equals deposits minus withdrawals between January 1, 2008 and September 30, 2010.
n.a. = not available. Some chi-square tests are not valid due to a large proportion of small expected cell counts. Some ratios cannot be computed due to a zero in the denominator.
ǂ $p < .10$; * $p < .05$; ** $p < .01$
[a] "Low-income" = below 200% of the federal poverty guideline. "Middle-income" = 200% to below 400% of poverty. "High-income" = at or above 400% of poverty.
[b] Public assistance includes TANF, SSI/SSDI, and SNAP.

Table 9. Mean Individual Savings Amount in Participant-Owned OK 529 Accounts and in Any Private OK 529 Account, by Treatment Status and Socioeconomic Characteristic

	Participant-Owned Account			Any Private Account		
	(1)	(2)	(3)	(4)	(5)	(6)
	Control	Treatment	p-value (T-C)	Control	Treatment	p-value (T-C)
Full Sample	$19.70	$75.51	<.01**	$75.74	$108.64	.23
Income/poverty ratio[a]						
High-income	145.59	441.82	.06ǂ	533.18	627.48	.67
Middle-income	6.76	77.00	.05*	41.20	99.03	.24
Low-income	1.48	12.75	<.01**	6.43	23.09	.14
p-value (across SES)	<.01**	<.01**		<.01**	<.01**	
Parent education						
Bachelor's degree or more	87.50	276.98	.02*	332.30	398.24	.58
High school graduate	0.00	14.81	<.01**	1.55	21.44	<.01**
Less than high school	0.00	0.06	.45	0.00	0.06	.45
p-value (across SES)	<.01**	<.01**		<.01**	<.01**	
Child race/ethnicity						
Non-Hispanic White	28.65	101.60	.02*	106.71	142.08	.45
African American	0.00	9.65	.01*	0.00	16.84	<.01**
American Indian	9.05	43.03	.37	28.08	45.46	.69
Hispanic	0.00	5.44	.18	22.91	49.30	.58
p-value (across SES)	.37	.14		.18	.11	
Banked						
Yes	24.89	96.23	<.01**	95.69	138.49	.23
No	0.0	0.38	.16	0.00	0.38	.16
p-value (across SES)	<.01**	<.01**		<.01**	<.01**	
Home ownership						
Own	39.68	168.90	<.01**	171.85	241.94	.30
Rent or other	5.44	8.22	.57	7.03	12.57	.34
p-value (across SES)	.04*	<.01**		<.01**	<.01**	
Public assistance[b]						
No	32.03	118.10	<.01**	128.00	166.90	.41
Yes	2.42	13.22	.07ǂ	2.42	23.48	.02*
p-value (across SES)	.02*	<.01**		<.01**	<.01**	
Primary language in home						
English	21.90	81.18	<.01**	84.21	117.63	.28
Other	0.00	19.27	.03*	0.00	19.57	.03*
p-value (across SES)	<.01**	<.01**		<.01**	<.01**	

Sources: SEED OK baseline survey and account monitoring data and 2007 Oklahoma state birth records
Notes: "Individual savings" come from deposits made by parents, other family members, and friends. Amount equals deposits minus withdrawals between January 1, 2008 and September 30, 2010. All median values are zero.

ǂ $p < .10$; * $p < .05$; ** $p < .01$

[a] "Low-income" = below 200% of the federal poverty guideline. "Middle-income" = 200% to below 400% of poverty. "High-income" = at or above 400% of poverty.

[b] Public assistance includes TANF, SSI/SSDI, and SNAP.

Total 529 assets

Table 10 shows results for total 529 assets, which include individual savings as well as SEED OK incentives. All differences between treatment and control groups are significant at the .01 level; these p-values are not shown in the table. Several patterns are evident. First, within the control group, the percentage with any 529 assets varies by SES (Column 1). Within the treatment group, there is essentially no variance by SES in the percentage with any 529 assets (Column 2). Second, as expected, virtually every child in the treatment group has 529 assets. In contrast, children in the control rarely have any 529 assets. The impact of SEED OK is greater for low-SES subgroups whether percentage-point differences or ratios are used to assess impact.[25] Third, mean asset amounts are much higher for the treatment group than for the control group (Columns 5 and 6). All of these patterns are explained largely by the SEED OK treatment of a $1,000 automatic initial deposit. At the same time, for the treatment group, there is significant variance by SES in mean asset amount (Column 6) because advantaged individuals are more likely to have individual 529 savings than disadvantaged individuals.

[25] The percentage-point difference for high school graduates is slightly larger than the percentage-point difference for those with less than a high school education (99.8 vs 99.7). Again, this finding is sensitive to the fact that the mother who declined the state-owned account has less than a high school education.

Table 10. Percentage with Any Assets in Any OK 529 Account and Mean Asset Amount, by Treatment Status and Socioeconomic Characteristic

	Percent with Assets				Mean Asset Amount	
	(1)	(2)	(3)	(4)	(5)	(6)
	Control	Treatment	Difference (T - C)	Ratio (T/C)	Control	Treatment
Full Sample	2.1	99.9	97.8	47.6	$75.74	$1,129.85
Income/poverty ratio[a]						
High-income	13.8	100.0	86.2	7.2	533.18	1,681.69
Middle-income	1.3	100.0	98.7	76.9	41.20	1,129.68
Low-income	0.4	99.9	99.5	249.8	6.43	1,036.82
p-value (across SES)	<.01**	n.a.			<.01**	<.01**
Parent education						
Bachelor's degree or more	9.0	100.0	91.0	11.1	332.30	1,452.09
High school graduate	0.2	100.0	99.8	500.0	1.55	1,036.28
Less than high school	0.0	99.7	99.7	n.a.	0.00	999.10
p-value (across SES)	<.01**	n.a.			<.01**	<.01**
Child race/ethnicity						
Non-Hispanic White	3.0	99.9	96.9	33.3	106.71	1,167.60
African American	0.0	100.0	100.0	n.a.	0.00	1,029.64
American Indian	0.9	100.0	99.1	111.1	28.08	1,054.87
Hispanic	0.8	100.0	99.2	125.0	22.91	1,056.99
p-value (across SES)	n.a.	n.a.			.18	.06ǂ
Banked						
Yes	2.7	99.9	97.2	37.0	95.69	1,164.16
No	0.0	100.0	100.0	n.a.	0.00	1,005.54
p-value (across SES)	<.01**	n.a.			<.01**	<.01**
Home ownership						
Own	4.6	99.9	95.2	21.7	171.85	1,274.22
Rent or other	0.4	100.0	99.6	250.0	7.03	1,025.79
p-value (across SES)	<.01**	n.a.			<.01**	<.01**
Public assistance[b]						
No	3.5	99.9	96.4	28.5	128.00	1,194.00
Yes	0.2	100.0	99.8	500.0	2.42	1,036.17
p-value (across SES)	<.01**	n.a.			<.01**	<.01**
Primary language in home						
English	2.4	99.9	97.5	41.6	84.21	1,139.66
Other	0.0	100.0	100.0	n.a.	0.00	1,032.56
p-value (across SES)	n.a.	n.a.			<.01**	<.01**

Sources: SEED OK baseline survey and account monitoring data and 2007 Oklahoma state birth records
Notes: "Any assets" include net deposits made by parents and others to private OK 529 accounts, as well as SEED OK incentives. Amount equals deposits minus withdrawals between January 1, 2008 and September 30, 2010. All treatment and control differences are significant at the .01 level.
n.a. = not available. Some chi-square tests are not valid due to a large proportion of small expected cell counts. Some ratios cannot be computed due to a zero in the denominator.
ǂ $p < .10$; * $p < .05$; ** $p < .01$
[a] "Low-income" = below 200% of the federal poverty guideline. "Middle-income" = 200% to below 400% of poverty. "High-income" = at or above 400% of poverty.
[b] Public assistance includes TANF, SSI/SSDI, and SNAP.

Discussion

This research examines the holding of any 529 account, including both automatically opened state-owned accounts and private 529 accounts opened by individuals. Holding a 529 account, whether actively or automatically opened is an important outcome for several reasons. Having a *labeled* account (e.g., "Tanya's college account") and receiving quarterly 529 account statements may increase saving by making the goal (assets for future college expenses) more salient. Having a *tax-favored* account may increase saving by families who benefit from the tax provisions. And, opening or receiving a 529 account when a child is young allows more time for people to make deposits and for assets to accumulate, and more time for a child to be aware that there is college savings in her name.

Under the CDA model advocated by Sherraden and others (Boshara, 2007; Sherraden and Stevens, 2010), CDAs would be opened automatically for every child at birth. However, in the SEED OK experiment, it is useful to examine the holding of private accounts, which must be opened by individuals. Active account opening shows that adults are interested in planning for college expenses. Comparisons between treatment and control groups allow us to examine the impact of SEED OK information and incentives on the holding of private accounts. Later, researchers can examine whether active account holding and active saving have different effects than passive account holding and passive asset accumulation.

This research also examines individual 529 savings. Individual savings is not the primary outcome of interest because SEED OK is a test of universal and progressive policy, not a test of individual behavior. Still, CDA policy will be more effective, and presumably more politically popular, if it encourages individual saving as well as providing subsidies. In addition, because SEED OK match money is targeted to lower-income families to increase saving as well as to subsidize asset building, it is important to examine whether the treatment does increase saving by low-income and other disadvantaged families. However, comparing the impact of SEED OK on individual savings for different SES subgroups is complicated by the fact that disadvantaged subgroups, on average, have less ability to save out of income, have less savings to reshuffle, and are less likely to expect their children to go to college (Hao and Bonstead-Bruns, 1998; Zhan, 2006; Zhan and Sherraden, 2011).

Finally, we examine total 529 assets, which include SEED OK incentives. As discussed above, this is one of the most useful measures of the impact of SEED OK. It is more related to the adequacy of funds to finance college than individual savings alone. Also, SEED OK is intentionally progressive, and it is impossible to measure the impact of this progressivity without considering SEED OK incentives.

Findings reveal that, without SEED OK, few young children have 529 accounts or 529 assets. Not surprisingly, disadvantaged children are particularly unlikely to have 529 accounts and assets: Without SEED OK, rates of 529 account holding and asset ownership are less than 1% for almost all disadvantaged subgroups. With SEED OK, account-holding rates for 529 accounts that must be opened by individuals range from 2.2% to 10.4% for disadvantaged subgroups, with most rates greater than 6%. And, nearly 100% hold some 529 account and some 529 assets.

Statistical tests of treatment-control differences show that SEED OK has a significant impact on some but not all of the outcomes examined. SEED OK increases 529 account holding—even for

accounts that must be opened by individuals. SEED OK also increases the likelihood that parents or others are setting aside college savings for very young children. These patterns hold for diverse SES subgroups. However, it is not clear that SEED OK increases the *amount* of 529 savings, in all SES subgroups. The treatment group has greater average savings amounts than the control group, but these differences are only sometimes statistically significant.

What do we make of the fact that SEED OK increases the likelihood that young children have some college savings but does not clearly increase the amount of savings in all SES subgroups?[26] As noted above, savings amounts are very skewed, and large variances decrease the likelihood that differences are statistically significant. Also, the SEED OK intervention occurred during an economic recession. Families may have had less "surplus" income than usual to put toward savings, and declines in the value of the state-owned OK 529 may have made treatment participants less willing to save in their own OK 529 accounts.[27] Thus, the recession may have dampened responses to the SEED OK incentives, but there is no way to test this proposition. Regardless, we believe that saving something for college—even a small amount—is an important outcome. Having some college savings and the act of setting aside money for college may "plant a seed": Parents may now be more aware of college as a possibility for their children and more cognizant of the importance of saving for college.

At the same time, the amount of money accumulated for college does matter. A small amount of savings will not finance a college education for most and may not change parent and child attitudes and behaviors in the pre-college years. Although every treatment child (except one) has at least $1,000 in 529 assets, advantaged children in the treatment group tend to have more, because their parents (and others) are more likely to have made their own deposits. Over time, the difference in 529 assets held by advantaged and disadvantaged children is likely to grow. If assets continue to be an important source of funding for college, and if increased access to college for disadvantaged groups is a goal, then disadvantaged families may need additional subsidies. Evidence that 529 assets affect parent and child attitudes and behaviors in ways that improve educational outcomes—a question to be considered in future SEED OK research—could provide further rationale for additional progressive subsidies.

What about the impact of SEED OK on outcomes that are linked to *automatic* components of the intervention? A growing body of literature in behavioral economics (e.g., Madrian and Shea, 2001; Choi et al., 2004) suggests that automatic enrollment and other default rules can strongly influence participation in asset-building programs. Not surprisingly, SEED OK has a large effect on total 529 assets (which include SEED OK subsidies), for every subgroup examined. In the control group, children rarely have any 529 assets. In the treatment group, all children except one (whose mother declined the state-owned account) have assets, and most have more than $1,000. The automatic nature of certain components of the intervention also has a striking impact on variation in outcomes by SES. Automatic opening of state-owned 529 accounts eliminates virtually all variation by SES in account holding, and automatic initial deposits eliminate most (but not all) variation by SES in asset accumulation. All of these patterns are perhaps predictable, but this does not make them less

[26] Nam et al. (in press) find that SEED OK does increase the amount of individual 529 savings across the full sample of SEED OK families.

[27] The $1,000 deposited in the state-owned OK 529 was invested in the Balanced Option, a mix of stocks and bonds. Depending on the account-opening date, the value of the state-owned account fluctuated between a high of $1,003 and a low of $698 during the time that the account-opening incentive was offered.

meaningful. If policy aims to increase account holding and asset holding by disadvantaged subgroups—that is, if universality is a goal—the evidence strongly supports automatic account opening with an initial and automatic deposit.

The findings summarized so far do not reveal striking differences by SES in the impact of SEED OK. That is, for the outcomes that are affected by SEED OK, there are positive impacts for both advantaged and disadvantaged subgroups. Still, it is possible to ask whether advantaged or disadvantaged subgroups benefitted more from SEED OK. The answer depends upon the outcome examined and, sometimes, the computation used to compare across SES. For outcomes that are not directly influenced by automatic treatment features (i.e., holding a participant-owned 529 account, holding any private 529 account, having any individual 529 savings), patterns differ by computational choice. When we measure impact as absolute increase in the percentage with a favorable outcome, regardless of starting point (that is, when we compare percentage-point differences between treatment and control groups), advantaged subgroups consistently benefit more from SEED OK. When we take into account the starting points of each SES subgroup and measure impact with ratios, disadvantaged subgroups often—but not always—benefit more from SEED OK.

For outcomes that are directly influenced by automatic components of the intervention (i.e., holding any 529 account and having any 529 assets), both methods of comparison indicate that SEED OK has a greater impact on disadvantaged subgroups. This pattern occurs because disadvantaged subgroups are less likely to have accounts and 529 assets in the absence of SEED OK, so automatic account opening and automatic deposits increase account holding and asset holding more for these subgroups.

Limitations

Although SEED OK makes use of a rigorous experimental research design and randomization was successful, some limitations remain. First, only 38% of parents who were invited to participate in SEED OK chose to do so. As noted above, this response rate is not abnormally low for a telephone survey, and data from birth records suggest that participants and nonparticipants are similar. Still, it is possible that these two groups differ on unobserved characteristics that affect ability and willingness to save in a 529 account.

Second, we examine only OK 529 accounts; we do not have data on college savings in other saving vehicles. Because SEED OK provides incentives to save in OK 529 accounts for the treatment group, but not the control group, members of the control group may be more likely to save in other vehicles. Deposits in OK 529 accounts may be deducted from state income taxes, and this incentive is offered to all Oklahoma residents. Still, the estimated effect of the SEED OK intervention might be weaker if we measured all college savings, not just OK 529 savings. The fact that we examine only OK 529 accounts also means that we have no measure of net worth. As a result, we cannot assess whether OK 529 deposits represent new savings or shifted assets.

Third, we examine *early* SEED OK outcomes, including early saving by individuals. Saving by both treatment and control groups may increase over time as children age and college becomes more salient. Saving may increase further for members of the treatment group if the SEED OK promotional material or automatic opening of accounts has "jump-started" parents' planning for children's college education, or if the quarterly account statements for automatically opened

accounts serve as effective reminders about the importance of saving for college. On the other hand, saving by treatment members may decrease over time if cognitive and/or attitudinal effects of the SEED OK treatment "wear off" over time.

Future research

One of the strengths of this study is the diversity of socioeconomic subgroups examined. By using multiple indicators of SES, we identify patterns that are consistent whether SES is measured by income, education, race, and more. However, there is also value in examining some indicators of SES in more detail. For example, in contrast with the overall patterns, we find that some differences by race/ethnicity are not significant. Future research could examine race more closely. What is the impact of race on SEED OK outcomes when other variables are controlled? What is the impact of race on SEED OK outcomes when researchers take into account the fact that race also is associated with income, education, and more? Similar questions may be examined for other indicators of SES, such as income and education.

Future research could also examine the impact of different components of the SEED OK treatment. This research examines the *overall* impact of SEED OK, and we cannot say which components of the SEED OK treatment were most influential. For example, did the opportunity to earn match money and/or the $100 account-opening incentive encourage the opening of participant-owned accounts? Did the opportunity to earn match money encourage saving by lower-income families? Answers to these questions will likely have important implications for the design of CDA initiatives.

Many other policy-relevant research questions may be asked when additional data from on-going account monitoring and from the follow-up survey are available. For example, with longer-term data on OK 529 participation, researchers can ask whether the impact of SEED OK remains steady over time, increases, or "wears off." And, what happens to differences by socioeconomic status? Do low-SES families fall further and further behind in asset accumulation for college? Does SEED OK reduce disparities between advantaged and disadvantaged families, compared to what would have occurred without the intervention? Of particular importance is research examining the impact of SEED OK on the attitudes and behaviors of parents and children, especially attitudes and behaviors related to cognitive development and education. SEED OK will likely be judged a partial success, at best, if it increases 529 savings and assets but does not change attitudes and behaviors in ways that improve educational outcomes.

Conclusions

SEED OK provides the best evidence to date regarding the likely outcomes and the impact of a universal and progressive Child Development Account policy. The findings reported here show that, in the absence of a universal initiative, few preschool children have a college savings account or any college savings in their name. Even with SEED OK, which provides information and incentives, the likelihood that parents or others have opened and saved in a 529 account is relatively low (except in the highest income and education groups). Adults may open accounts and begin saving later, of course, but *early* saving has important advantages. In addition to the financial benefits of investment returns, the presence of college savings from an early age may affect the

attitudes and behaviors of both children and adults in ways that improve educational outcomes (Williams Shanks et al., 2010).

The patterns are noticeably different for outcomes that are related to automatic components of the treatment. Except for the child whose mother opted out, all children in the treatment group have a state-owned 529 account, and all have at least $1,000 in 529 assets. The fact that these patterns were predictable does not make them less meaningful. If universality is a goal—that is, if we as a society want children from disadvantaged families, not just children from advantaged families, to grow up with accounts and savings for postsecondary education—the evidence clearly favors automatic account opening and some automatic subsidies. If *early* account holding and *early* asset accumulation are desirable, then automatic account opening at birth makes sense.

As Nam et al. (in press) argue, SEED OK has shown that a universal CDA policy can be implemented, at birth, on a platform of 529 accounts. Future research can examine whether SEED OK has an impact on 529 account holding, individual 529 savings, and total 529 assets as more time passes and whether these savings outcomes affect parental attitudes and behaviors, and later outcomes for children, especially cognitive and educational outcomes.

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