Maryland Enhanced Childcare Support and Teacher Retention Award (ECSTRA) and Workforce Survey

Report

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The Impacts of Maryland's Enhanced Childcare Support and Teacher Retention Award (ECSTRA) Bonus Program

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The Impacts of Maryland's Enhanced Childcare Support and Teacher Retention Award (ECSTRA) Bonus Program

Key Takeaways

- Turnover in the early childhood education workforce is a prevalent issue that state and local governments are attempting to resolve through compensation and retention bonus programs. In 2023-2024, the Maryland State Department of Education piloted the Enhanced Childcare Support and Teacher Retention Award (ECSTRA) Program, which tested $1000, $2000, or $3000 retention bonus offers as a means to reduce turnover, rewarding those who stayed at their licensed childcare site for 5 months (to receive the first half of the bonus) and 8 months (to receive the second half).
- Receiving an ECSTRA bonus was an overwhelmingly positive experience for educators' financial and emotional well-being (Figure 3). In their survey responses, bonus recipients reported meeting basic living expenses with less stress, paying down debts, and buying groceries more comfortably (Figure 4). They also expressed feeling more valued and excited about their work (Figure 5).
- Because of the way MSDE implemented the pilot program, researchers had a unique opportunity to use a rigorous randomized controlled trial design to estimate the causal effects of ECSTRA bonus offers on early educator turnover. The study included 5,446 early educators, with 25% not receiving a retention bonus offer (the control group for the study).
- Overall, the ECSTRA Program modestly reduced turnover rates by about 1.7 points: Participants receiving ECSTRA bonus offers had a turnover rate of 7.8%, relative to a turnover rate of 9.5% among educators not offered a bonus (Figure 6).
- The ECSTRA Program had considerably stronger effects for early career educators and educators with lower wages at baseline. Among those in the first five years of their career, ECSTRA bonus offers reduced 8-month turnover by 9.1 points (from 19.8% to 10.7%)—a 46 percent reduction in turnover (Figure 7). Lower-wage educators experienced a 31 percent reduction in turnover (Figure 8). These subpopulation findings suggest that retention bonus programs may be particularly compelling for newer, lower-paid staff.

This report is part of a series that, combined, aims to study the early educator workforce in Maryland and how retention bonuses from the Enhanced Childcare Support and Teacher Retention Award (ECSTRA) Program may have influenced turnover. The purpose of this report is to examine the impacts of the Maryland State Department of Education's (MSDE) ECSTRA Program on a variety of educator experiences and outcomes.

This report answers the following questions: (Q1) What Percent of ECSTRA RCT Participants Remained in Their Site? (Q2) What Were ECSTRA Bonus Recipients' Experiences with the ECSTRA Program? (Q3) How Might ECSTRA Bonuses Have Helped Early Educators? (Q4) Did Recipients Report Bonuses Improve Their Job Outlook? (Q5) Did the ECSTRA Program Reduce Overall Teacher Turnover? (Q6) Did Some Early Educators Benefit More from ECSTRA Bonuses?

Background

What Is the ECSTRA Program?

Young children thrive when they have stable and engaging relationships with their caregivers. Yet, early educators are among the lowest-paid workforce in the United States, which likely contributes to high turnover rates in childcare settings (Cooksey & Thomas, 2024; Totenhagen et al., 2016). Volatility in the childcare workforce can compromise children's early development and create challenges for improving the quality of childcare services.

To address both turnover and compensation challenges in the early childhood education (ECE) workforce, state and local governments are increasingly considering approaches to improving early educators' compensation, including through retention bonus programs. A recent study of a $1500 retention bonus program piloted in Virginia in 2019 reduced 8-month turnover rates by nearly half (Bassok et al., 2021). Yet, such programs are relatively new, and it is unknown whether such large effects would manifest in different contexts. There also continues to be much to learn about the design of bonus programs to maximize their impact. In the face of constrained funding, policymakers will need to make consequential decisions about the scope of such programs, how large retention bonuses need to be to affect turnover, and whether certain populations of ECE teachers would be most responsive to retention bonuses.

In 2023, MSDE piloted the ECSTRA Program[1] as a potential policy strategy to help stabilize its ECE workforce. ECSTRA directed American Rescue Plan Act (ARPA) funds directly to eligible early educators who remained in their same childcare sites and roles for an up-to-8-month period via retention bonuses.

Eligibility to Participate in ECSTRA

Individual early educators[2] who met the following criteria were invited to complete a brief online application between August 22, 2023, and October 3, 2023 (the application period):

- Employed in any eligible Maryland licensed childcare program[3]
- Employed for at least 20 hours per week in a role working directly with children under 5
- Currently held a MDCC Credential Program credential (any level)

Requiring a valid MDCC credential for ECSTRA participation has important implications for understanding the program's effects. Indeed, only 18% of MSDE ECE employees held a recent or current MDCC credential. The intent[4] of this requirement was to encourage and reward participation in the MDCC Credential Program, which itself aimed to enhance the quality of the

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[1] For complete details, see ECSTRA Program Information Guide and ECSTRA Program Frequently Asked Questions.
[2] Individual early educators applied to participate in ECSTRA directly, rather than site leaders on behalf of their employees.
[3] Eligible licensed programs included childcare centers, letter of compliance facilities, family childcare homes, and large family childcare homes. Programs administered through local education agencies were not eligible.
[4] The ECSTRA Program was in part informed by—but not directly connected to—Maryland House Bill 1100 (HB1100), which, among other provisions, provided a $1000 retention bonus to childcare staff who held or earned a credential through the Maryland Child Care Credential (MDCC) Program between June 2022 and June 2023. Implementation of HB1100 concluded before the launch of the ECSTRA Program.

ECE workforce through professional development. On one hand, requiring an MDCC credential for ECSTRA could serve as a way to identify early educators whom MSDE is most interested in retaining, given that funding to pilot the ECSTRA Program could not allow all ~50,000 early educators to participate. However, in practice, early educators who had already obtained an MDCC credential tended to have significantly more experience. These individuals may have already demonstrated their commitment to remaining in childcare by completing the MDCC credential process. As a result, requiring a credential for ECSTRA participation may have pre-selected early educators who were already highly committed to staying in their roles. Thus, the ECSTRA Program may have been targeted to a rather narrow segment of Maryland's overall workforce and thus may have different effects for credentialed educators eligible to participate rather than if the program were more widely available.

ECSTRA Bonus Amounts

To fairly determine who would and would not be offered an ECSTRA retention bonus, MSDE conducted a random lottery process. Because funding for the pilot of the ECSTRA Program was limited, and to facilitate a study of ECSTRA's effects, 25% of eligible applicants were not selected to participate using this lottery. As described below, this allowed for the observation of a control group. The size of the ECSTRA bonus ($1000, $2000, or $3000) for the remaining 75% of eligible applicants was also determined by the lottery process.

Outreach to Encourage Early Educators to Participate in ECSTRA

There was extensive outreach about the ECSTRA Program: multiple Tuesday Tidbits announcements, posts on the MSDE website, six open customer support sessions (recordings also posted), presentations to the Office of Child Care (OCC) Advisory Council, and emails sent to all recent and current holders of an MDCC credential. As of October 2023, 9,174 early educators held a valid credential[5] and were likely eligible to participate in ECSTRA. Ultimately, 5,446 applications were verified as eligible to participate.

Receiving ECSTRA Bonus Payments

As part of the application process, MSDE explained to all ECSTRA applicants the requirement to receive their ECSTRA bonus: Remain employed in the same licensed childcare site in their eligible role from the start of the ECSTRA Program (October 25, 2023) for at least 5 months to receive the first half of the ECSTRA bonus, and at least 8 months to receive the second half of the bonus.[6] Site leaders were asked to verify each early educators' eligibility for payments before bonuses were disbursed. Individual bonus recipients were paid directly through existing MSDE reimbursement systems in place for other MSDE initiatives.[7]

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[5] 18% of all employees in MSDE's data system of employees in licensed sites.

[6] The exact language of requirements to remain bonus-eligible was: "(1) Be employed in the licensed childcare site that they were at the start of the ECSTRA Program; (2) Teach or provide care for children aged 0-5 (not including kindergarten); (3) Work at least 20 hours per week, on average." There were some exceptions and accommodations for these requirements—see the ECSTRA Program Information Guide and ECSTRA Program Frequently Asked Questions.

[7] Due to eligibility requirements, all ECSTRA RCT participants were already part of the MDCC Credential Program, which itself had separate bonus opportunities and thus already had payment information established. Payments were made either via regular check or electronic deposit, based on each early educators' selected preference.

UVA Study of the Effects of the ECSTRA Program

A research team at the University of Virginia (UVA) conducted a study of MSDE's ECSTRA Program alongside the program's implementation. The primary goal of the research study was to explore the relationship between ECSTRA bonus offer amounts and site turnover reduction. To accommodate the financial constraints given limited ARPA funding, the ECSTRA Program used a lottery-based approach to fairly allocate the limited opportunities to participate in the program and at each bonus level. As a result, the UVA study team was able to leverage the lottery to use a randomized controlled trial (RCT) design: Among eligible applicants (N=5,446), about 75% were randomly[8] selected to receive a retention bonus offer of either $1000, $2000, or $3000 (about 25% in each payment group). These individuals constitute the "treatment" group in the RCT study. The remaining 25% of applicants were randomly assigned not to receive a bonus offer, forming the "control" group. This control group is essential because it serves as the key point of comparison for understanding whether, and by how much, the ECSTRA bonus offers actually reduce turnover. Because randomization solely determined treatment status, there are no differences in the baseline characteristics of early educators across groups *other than their ECSTRA bonus offer*.[9]

Data Collection for the Study

To implement the ECSTRA Program, MSDE needed to verify which participants had consistently remained in their eligible site/role as of March 13, 2024 (at least 5 months) to receive the first half of the bonus and as of June 5, 2024 (at least 8 months) for the second half of the bonus. The research team designed and administered a 5- and 8-Month Employment Verification Form for this purpose.[10]

To supplement the study of ECSTRA's effects, the research team also administered an online Baseline Survey to a large sample of early educators just before the ECSTRA Program began (August/September 2023), as well as an online Follow-Up Survey two months after the ECSTRA Program ended (August 2024).[11] The information from these surveys is used in some analyses, although a limitation is that only 55% of the ECSTRA participants completed the Baseline Survey, and about 65% completed the Follow-Up Survey.

In addition, the RCT study also leveraged data from MSDE's Childcare Administrative Tracking System (CCATS),[12] which includes data on approximately 50,000 early educators working at any

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[8] The randomization occurred at the site-level to ensure applicants from the same site were all randomized to the same bonus tier (rather than colleagues working at the same site or even the same classroom being offered different bonus amounts). Additionally, the randomization was blocked by geographic regions as well as by site type (i.e., large childcare centers, small childcare centers, and family child were all randomized separately), to ensure these characteristics were appropriately balanced across treatment groups.

[9] See Appendix A for a statistical comparison of the treatment and control groups, in terms of baseline covariates, which shows that the groups were well-balanced.

[10] The following reports describe the Employment Verification data collection in March and June.

[11] These reports provide additional information on the implementation of the Fall 2023 Baseline Survey, and August 2024 Follow-Up Survey.

[12] The dataset from CCATS was provided to the UVA research team by the Regional Economic Studies Institute (RESI) at Towson University. The CCATS collects information on *all* MSDE licensed sites serving children under five. The CCATS

of MSDE's approximately 6,800 licensed childcare sites. Although the variables available from CCATS are limited, an advantage of the CCATS data is that it enables a comparison of ECSTRA participants to the full MSDE early educator population.

Who Was in the RCT Study of the ECSTRA Program?

Ultimately, 5,446 early educators were part of the RCT study to estimate the causal impacts of the ECSTRA bonuses on turnover (1,290 randomly selected for the control group, 4,156 randomly selected for treatment group to receive an ECSTRA Retention bonus offer). Table 1 describes the composition of the ECSTRA RCT sample (left panel) and compares it to the entire population of MSDE early educators (right panel). The ECSTRA RCT sample was 97.8% female, 37.9% White, 28.4% Black, 6.2% Asian, and 11.5% Hispanic.[13] The average age was 42.5 years old. About 22% held a leadership position at their site, and 100% had an MDCC credential (an eligibility requirement). These ECSTRA RCT participants worked in 1,576 licensed sites. About 60% of the ECSTRA sites were childcare centers, while 33.6% were registered family childcare homes. Nearly all (93%) ECSTRA sites also participated in Maryland EXCELS,[14] with an average EXCELS rating of 2.5 out of 5. The average site's licensed capacity was 55.7 children (distributed across infants, toddlers, preschool-, and school-age children).

Comparing the left- and right-hand panels of Table 1 illustrates that the ECSTRA RCT sample was representative of the broader early educator population in some—but not all—ways. For instance, the two groups were relatively similar in terms of ethnoracial composition, average educator age, and the distribution across the 13 MSDE regions. However, there were also some key differences. Most notably, while all ECSTRA RCT participants were required to have an MDCC credential, this was relatively uncommon in the broader population (only 17.8%). Those in the ECSTRA RCT sample were also more likely to be female (97.8% vs. 83.5%) and hold a leadership role (22.0% vs. 12.7%).

The 1,576 sites with at least one ECSTRA RCT participant also differed from the full population of MSDE's 6,770 licensed sites. ECSTRA sites were more likely to be centers (60% vs. 35.2%), less likely to be family homes (33.6% vs. 59.7%), tended to be larger (average licensed capacity of 55.7 vs. 29.9 children), and were more likely both to participate in EXCELS (93.0% vs. 67.2%) and to have higher EXCELS ratings (2.5 vs. 1.8). While these differences affect how broadly the findings can be applied to all early educators in Maryland, they do not impact the internal validity of the study—meaning the randomized design still allows us to confidently determine whether ECSTRA bonuses caused changes in turnover among those who participated.

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contains both site-level information (e.g., licensing, registration, and program quality rating scores) and employee-level information (e.g., credentials, contact information, and some sociodemographic characteristics). Although MSDE's data system tracks information about licensed childcare sites and employees, it does not provide the real-time employment status required for determining ECSTRA bonus eligibility.

[13] In addition, 11.2% are in an "Other" category, which includes multi-racial, and 4.8% have missing race/ethnicity data.

[14] Maryland EXCELS is the state's quality rating and improvement system for childcare and early education programs. Maryland EXCELS rates the quality of programs on a scale of 1 to 5 (highest).

Table 1. Descriptive Statistics of ECSTRA RCT Sample versus Maryland EE Population

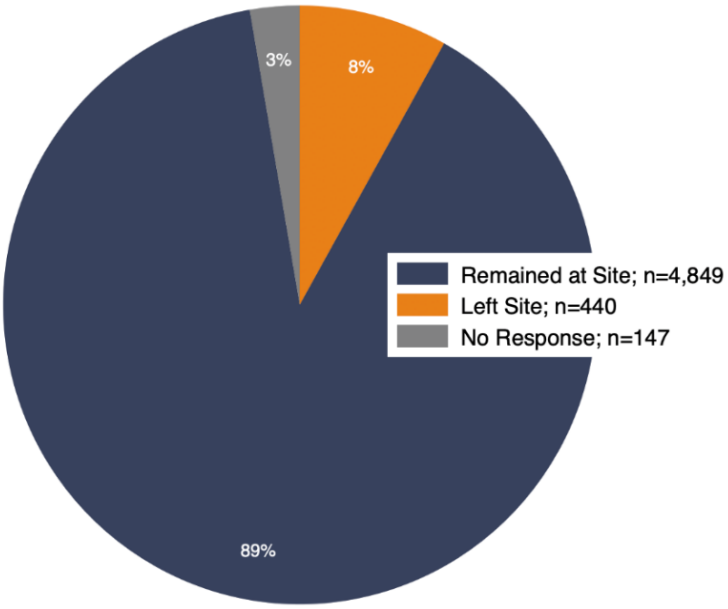
Characteristic	ECSTRA RCT Sample (N=5,446) Mean	Percentile 10th - 90th	% Missing (if any)	MSDE Population (Oct 2023) (N=51,664) Mean	Percentile 10th - 90th	% Missing (if any)
Employee-Level Characteristics						
Gender						
Female	97.8%			83.5%		0.1%
Race/Ethnicity						
White[1]	37.9%			35.5%		
Black[1]	28.4%			28.9%		
Asian[1]	6.2%			5.8%		
Hispanic, any race	11.5%			8.4%		
Other[1]	11.2%			8.0%		
Unknown[1]	4.8%			13.4%		
Age	42.5	24 - 61		42.0	20 - 64	
Credentialed (as of Oct 2023)[2]	100%			17.8%		
Holds a leadership position	22.0%		0.3%	12.7%		
	(N = 5,446 employees)			*(N = 51,664 employees)*		
Site-Level Characteristics						
Site Type (4-category)						
Childcare Center	60.0%		0.1%	35.2%		
Letter of Compliance[3] *Facility*	2.9%		0.1%	2.9%		
Family Childcare Home	33.6%		0.1%	59.7%		
Large Family Childcare Home	3.6%		0.1%	2.2%		
Site Employee Counts						
Total # of Employees	15.7	3 - 37	0.1%	8.5	2 - 20	
# of Credentialed Employees	5.6	1 - 15	0.1%	1.6	0 - 5	
Site Participates in EXCELS[4]	93.0%		0.1%	67.2%		
EXCELS 1-5 Rating	2.5	1 - 5	10.3%	1.8	1 - 3	38.6%
Site Capacity (# of spots for children)						
Total capacity	55.7	8 - 136	0.1%	29.9	7 - 86	
Infant capacity	4.7	0 - 12	0.1%	2.6	0 - 5	
Toddler capacity	3.8	0 - 12	0.1%	1.8	0 - 6	
Preschool capacity	34.7	1 - 92	0.1%	14.3	0 - 52	
School-age capacity	11.0	0 - 30	0.1%	9.2	0 - 30	
Site Offers Spots for Given Age Group						
Offers any infant capacity	73.0%		0.1%	73.6%		
Offers any toddler capacity	74.9%		0.1%	76.0%		
Offers any preschool capacity	96.3%		0.1%	87.7%		
Offers any school-age capacity	65.5%		0.1%	67.7%		
Licensing Regions						
Anne Arundel County	6.5%		0.1%	8.2%		
Baltimore City	12.2%		0.1%	9.9%		
Baltimore County	13.8%		0.1%	13.2%		
Prince George's County	9.3%		0.1%	13.5%		
Montgomery County	18.5%		0.1%	17.8%		
Howard County	7.0%		0.1%	6.4%		
Western Maryland	4.3%		0.1%	3.8%		
Upper Shore	3.2%		0.1%	3.8%		
Lower Shore	3.4%		0.1%	2.5%		
Southern Tri Counties	7.2%		0.1%	7.2%		
Harford and Cecil Counties	5.3%		0.1%	5.8%		
Frederick County	5.9%		0.1%	5.5%		
Carroll County	3.3%		0.1%	2.6%		
	(N = 1,576 sites)			*(N = 6,770 sites)*		

Note: [1] This racial category is reported for those who did not identify also as Hispanic. If an individual is identified as Hispanic, they are included in the "Hispanic, any race" category. [2] At the time of the ECSTRA Program launch in October 2023, there were 7 ECSTRA applicants whose credential status required updating. [3] Childcare programs run by tax-exempt, religious organizations. [4] Maryland EXCELS is the state's quality rating and improvement system for childcare and early education programs. Maryland EXCELS rates the quality of programs on a scale of 1 to 5 (highest).

Findings

(Q1) What Percent of ECSTRA RCT Participants Remained in Their Site?

Figure 1. Percent of ECSTRA Participants Remaining at Their Sites by Close of ECSTRA



Of the 5,436 employees[15] in the ECSTRA Program, 89% (N=4,849) had remained at their site by the end of the 8-month window, as shown in Figure 1.[16] Overall, this represents a relatively high retention rate (low turnover) among the ECSTRA RCT sample.

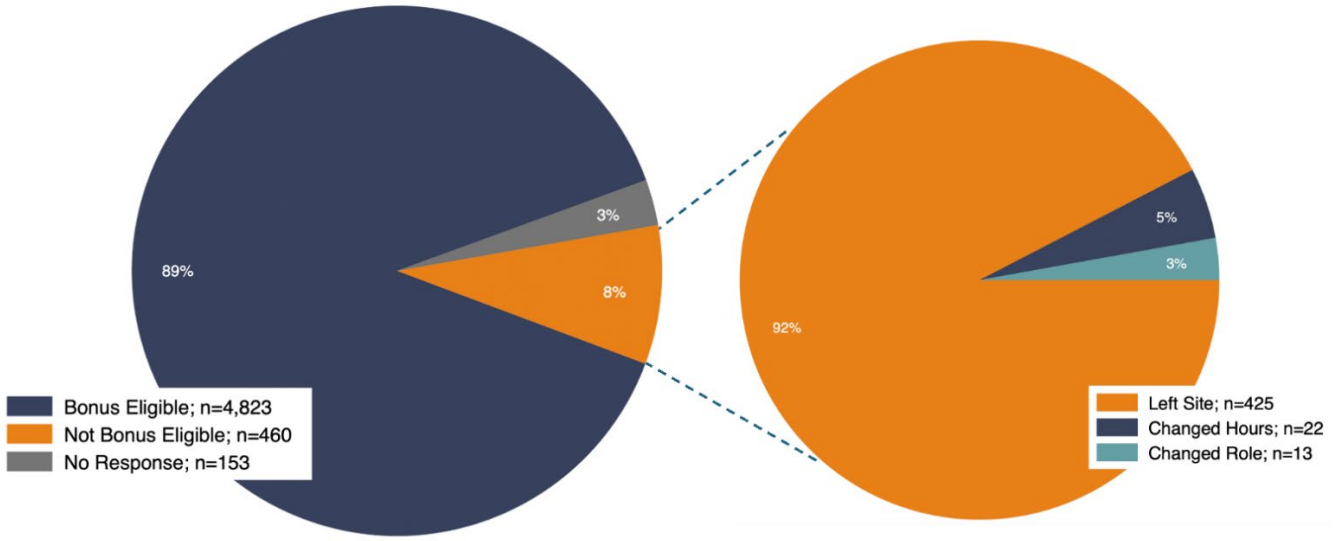
To offer some points of comparison, one study of publicly funded childcare centers in Louisiana documented retention rates of around 89% at roughly 6 months and 68% at one year (Bellows et al., 2022). Thus, ECSTRA's 8-month retention appears more comparable to Louisiana's 6-month rate. A Virginia study documented in childcare centers an 8-month retention rate of 70%, among an untreated control group, from May to December in 2019 (Bassok et al., 2021)—considerably more turnover than in the ECSTRA RCT sample.[17] One possible explanation the ECSTRA Program's 8-month retention rate is relatively higher could be that the ECSTRA sample is limited to MDCC credential-holders—perhaps a more stable subset of the MSDE workforce. Another factor could be that the ECSTRA retention period did not span a summer (Virginia's period did)—a time when turnover may naturally be higher.

While remaining in one's site was the primary requirement to receive an ECSTRA retention bonus, there were two additional requirements that meant a bonus offer recipient could remain in their site yet not receive their offered bonus: Participants also needed to (1) continue working in a role teaching/caring for children ages 0-5, and (2) still be employed at least 20+ hours per week.[18] However, in practice, these requirements rarely kept individuals from receiving an

[15] While 5,446 were randomized as part of the ECSTRA lottery, about 10 cases did not ultimately participate—either due to inaccurate information on application (did not have an MDCC credential, employee identifier provided linked to a different employee), and 3 who opted out of the program.
[16] These numbers are based on two Employment Verification Form data collection efforts led by UVA, in which site leaders recorded the status of their employees at both 5 and 8 months.
[17] It is worth noting that both these studies reported on retention rates before the pandemic.
[18] There were also exceptions that allowed some employees to sustain their bonus eligibility even if their site leader marked them as not meeting all criteria. These exceptions included site closures, changes due to budgetary reasons, and some types of personal circumstances. Additional information regarding exceptions can be found in the ECSTRA Program Information Guide and ECSTRA Program Frequently Asked Questions documentation.

ECSTRA bonus. Figure 2 reflects the entire RCT sample and their projected bonus eligibility, whether they were in a bonus or control group. Similar to the retention rate, 89% (4,823 of 5,436) met all criteria for receiving their ECSTRA bonus at the 8-month mark. For those 8% of employees that did not meet the criteria (460 of 5,436), the vast majority (92%) did not receive their payment because they had left their site. Only 5% (22 of 460) were not eligible due to hours reductions, and 3% (13 of 460) because they switched to a role that no longer cared for children ages 0-5.

Figure 2. Percent Receiving Bonus or Not, and Reasons Why Not (If Applicable)



(Q2) What Were ECSTRA Bonus Recipients' Experiences with the ECSTRA Program?

In August 2024, two months after the ECSTRA Program's 8-month retention period, the research team sent a Follow-Up Survey to a large sample of MSDE early educators, including all ECSTRA RCT participants. ECSTRA bonus recipients were asked questions about how they responded to receiving their bonus. In total, 64% (N=2,644) of the 4,156 ECSTRA bonus recipients answered these questions.[19]

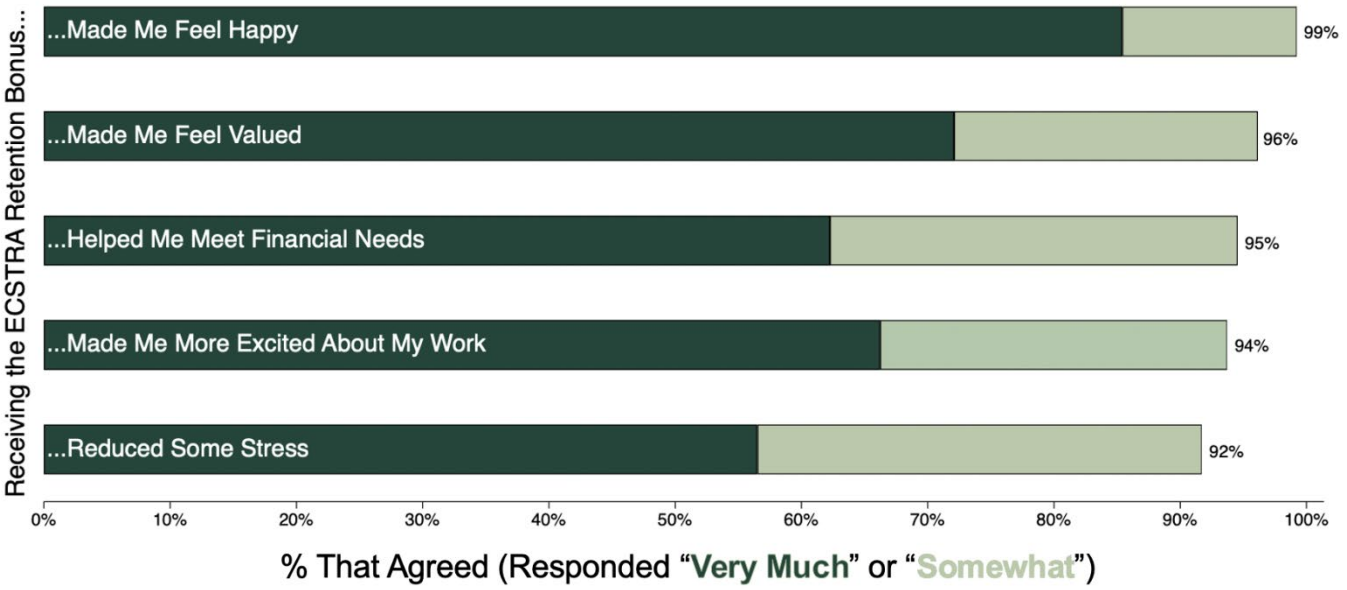
Receiving an ECSTRA bonus appears to have been very meaningful for early educators who responded to the Follow-Up Survey. As shown in Figure 3, 99% reported their bonus made them feel happy.[20] Likewise, the vast majority also reported that receiving a bonus made them feel their work was valued (96%), helped them meet their financial needs (95%), made them more

[19] Analyses in this section are limited in two ways: First, they are limited to actual bonus recipients (note that this differs from "bonus eligible" participants, which also includes those in the control group who met the criteria to receive a bonus but did not because they were in the control group). Second, they are limited to those bonus recipients who completed the Follow-Up Survey. Appendix B analyses suggest that that any findings that are based on the subset of Follow-Up Survey completers may be a fair representation of what findings would be like for the full ECSTRA RCT sample.

[20] Follow-Up Survey respondents were asked, on this question, to what extent they agreed (very much, somewhat, or not at all) with the following: "Overall, how much did receiving your ECSTRA Retention bonus… (a) ... make you feel happy; (b) ... help you meet your financial needs; (c) ... make you feel like your hard work was valued; (d) ... reduce some of your stress; (e) ... make you more excited about the work you do.

excited about the work they do (94%), and reduced some of their stress (92%). These findings for ECSTRA are consistent with responses to similar compensation initiatives in Virginia and the District of Columbia (Bassok et al., 2021; Sandstrom et al., 2024). While research shows that early educators suffer from high rates of depression and struggle with well-being and satisfaction,[21] the Follow-Up Survey results suggest early educators had positive experiences with ECSTRA, as demonstrated through their reports on morale and well-being.

Figure 3. Feelings Related to Receiving a Bonus



(Q3) How Might ECSTRA Bonuses Have Helped Early Educators?

Receiving the ECSTRA bonus may have eased financial demands on early educators in at least several ways. As shown in Figure 4,[22] when asked what specifically was made easier as a result of receiving the ECSTRA bonus, participants most often indicated buying groceries (86%), as well as paying for housing/bills (85%). Most also indicated that it was now easier to pay for car expenses (61%) and pay off debts (58%). About half found it easier to address emergency needs (57%), buy or save for something special for their family (56%), save money (55%), pay for recreational activities or vacation (52%), or pay for medical services (46%). Overall, these responses indicate that the ECSTRA bonus had a tangible positive impact on educators' financial stability and day-to-day expenses.

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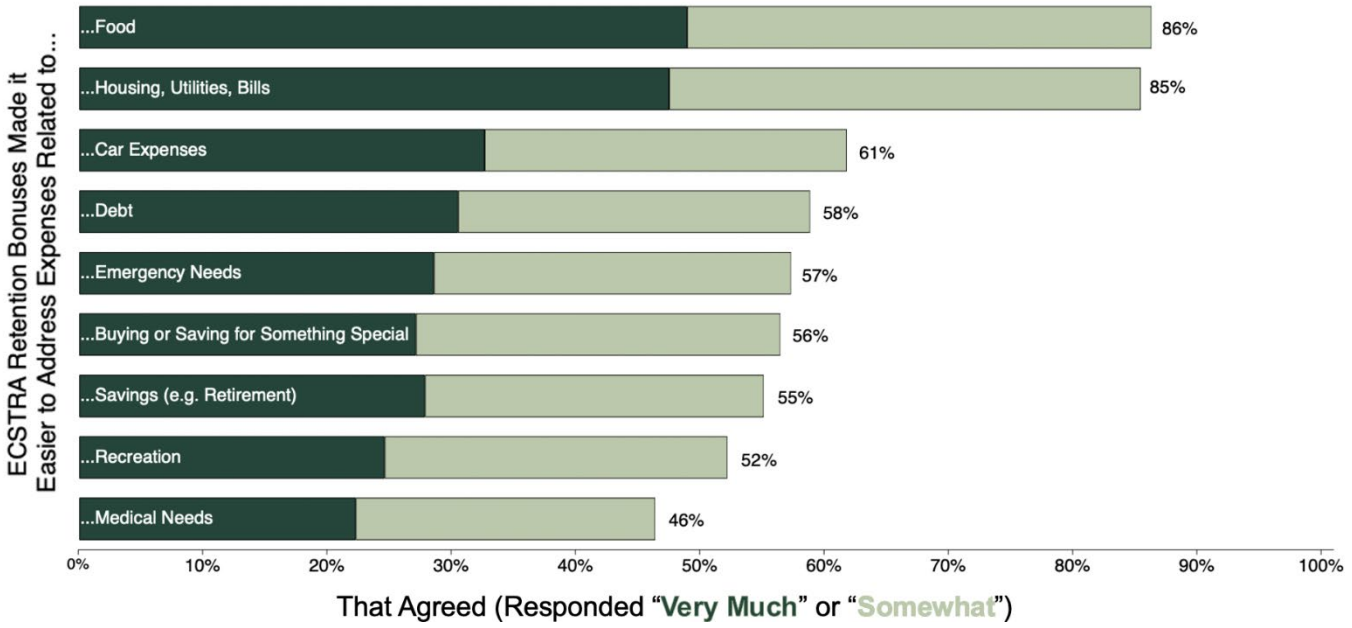
[21] Bassok et al. (2023) found that, in Virginia in 2022, 32% of the ECE teachers in their study experienced symptoms of depression that were considered "clinically relevant".

[22] Follow-Up Survey respondents who reported receiving a bonus payment were asked, on this question, to what extent they agreed (very much, somewhat, not at all, or N/A) with the following questions: "With the ECSTRA Retention bonus you received, has it been easier to do any of the following?" (a) Pay for housing, utilities, and/or bills; (b) Buy food/groceries; (c) Pay for car expenses; (d) Pay off debts (e.g., student loans, credit card debt); (e) Pay for medical services for you or family members; (f) Address emergency needs (e.g., home repairs, costs related to the pandemic); (g) Save money (e.g., for retirement, for emergencies); (h) Pay for recreational activities or vacation; (i) Buy or save for something special for your family (e.g., toys, summer camp, college savings).

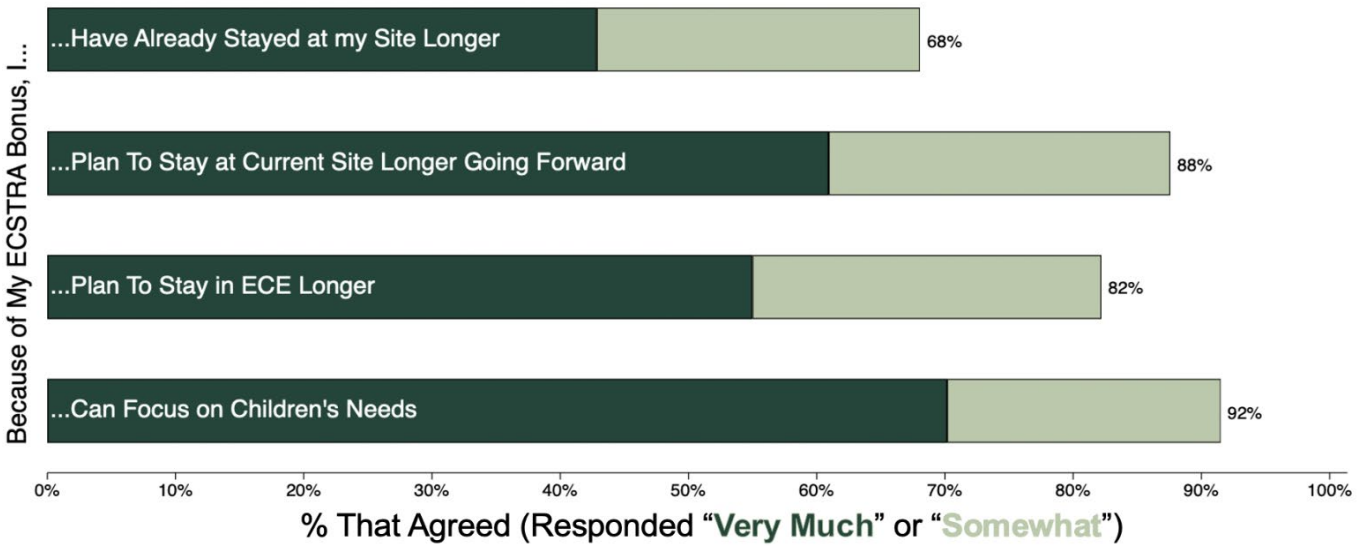
Figure 4. Expenses ECSTRA Bonus Helped Address



(Q4) Did Recipients Report Bonuses Improve Their Job Outlook?

Among ECSTRA bonus recipients who responded to the Follow-Up Survey in August 2024, most (68%) agreed that their ECSTRA bonus had already led them to remain in their current site longer than they otherwise would have—see Figure 5. They also reported that, looking ahead, they now intended to remain both in their site longer (88%) and in the field of ECE longer (82%) than they

Figure 5. Early Educators' Report of How Bonuses Shaped Career Decisions



planned to otherwise.[23] In addition, 92% reported that, because of the ECSTRA bonus, they were more able to focus on the children they serve. Together, these findings from the Follow-Up Survey highlight the many ways that receiving ECSTRA bonuses supported early educators—improving morale, easing financial pressures, and reinforcing their commitment to their sites and the field. While these self-reported benefits suggest that bonuses could help stabilize the workforce, they do not confirm whether turnover rates actually declined in practice. Next, we leverage the RCT data to assess whether ECSTRA bonus offers caused measurable reductions in teacher turnover, shedding light on the program's broader impact.

(Q5) Did the ECSTRA Program Reduce Overall Teacher Turnover?

The primary goal of the research study was to estimate whether the offer of retention bonuses (of varying amounts) caused reductions in early educator turnover. We find some evidence that ECSTRA bonus offers may have modestly reduced turnover overall (Figure 6).[24] Turnover rates fell (i.e., negative estimates) in all cases—for bonus offer amounts of $1000, $2000, and $3000 and at both the 5- and 8-month retention period. However, those reductions were small—between 1.0 and 2.2 points—and only statistically distinguishable from zero (i.e., no impact on turnover) for those offered a $2000 ECSTRA bonus. There is not a clear pattern indicating that the larger bonus amounts reduce turnover more than smaller ones.[25] Turnover reductions were greatest at the 8-month period among those offered a $2000 ECSTRA Bonus: While those randomly-selected to not participate in ECSTRA (the control group) had an overall 8-month turnover rate of 9.5%, those offered the $2000 ECSTRA bonus had only a 7.2% turnover rate during the same period—a turnover reduction of 2.2 points.

Given that estimated effects do not appear to depend on bonus amount ($1000, $2000, or $3000), we also estimate the overall effect of *any* bonus offer (as a single group). ECSTRA bonus offers led to a modest reduction in 8-month turnover across the entire RCT sample of 1.7 points, or roughly an 18 percent decrease. When interpreting this finding, it is crucial to recognize that baseline turnover was already low in the ECSTRA control group, wherein only 9.5% of early educators left their site between October 2023 and June 2024 (in the absence of a bonus offer). Consequently, there was limited room for turnover rates to fall further in response to retention bonuses. For context, turnover in the control group of Virginia's Teacher Recognition Program (TRP) study was 25.2% over an 8-month period (May to December 2019)—substantially higher

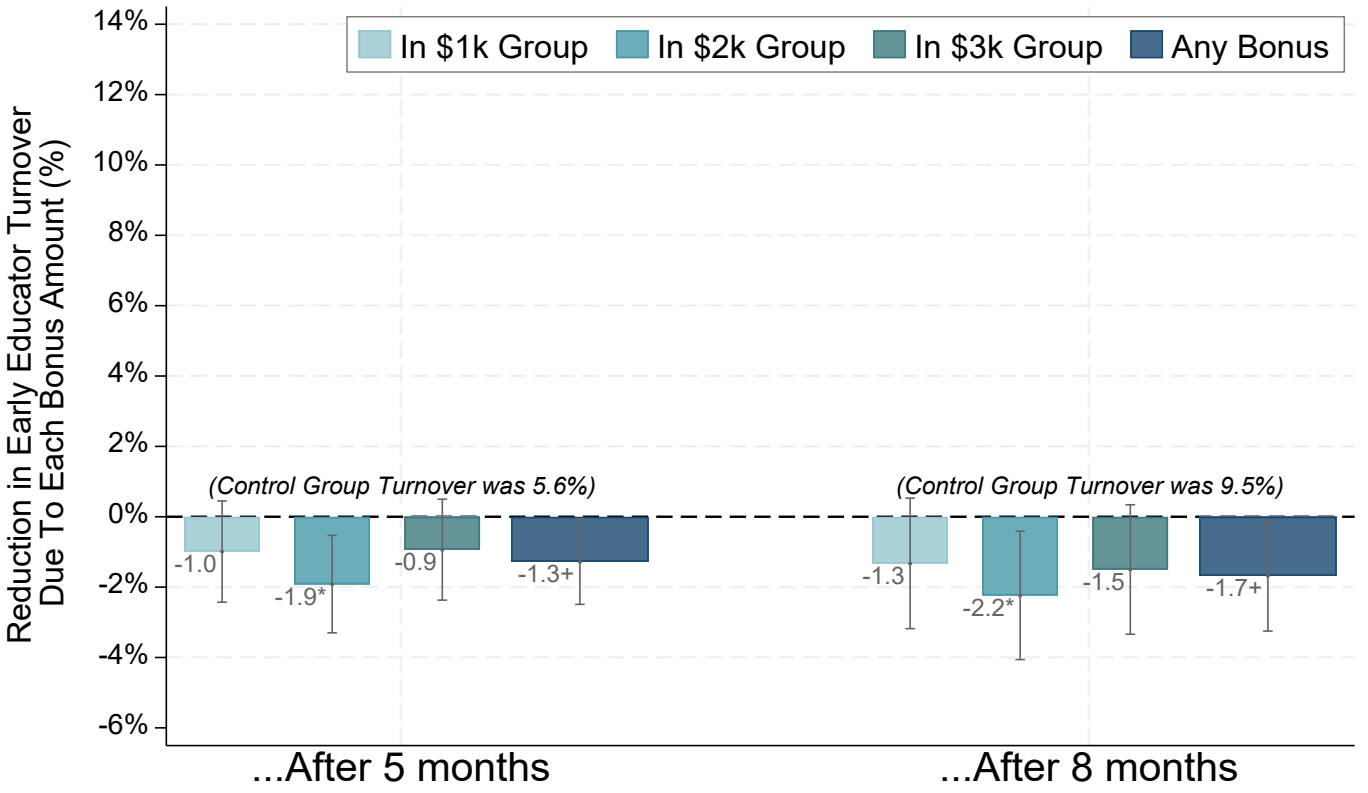
[23] Follow-Up Survey respondents who reported receiving a bonus payment and were also not in a director role at their site (2,109 of 2,652) were asked on this question to what extent they agreed (very much, somewhat, not at all) with the following questions: "Because of my ECSTRA Retention bonus, I…" (a)… remained at my October 2023 MSDE childcare site longer than I would have otherwise; (b) ... will continue to stay in my current site longer going forward; (c) ... will continue working as an MSDE early educator longer than I would have otherwise; (d) … am able to focus on the needs and development of children I work with.

[24] ECSTRA's causal effects were estimated via logistic regression, predicting whether each participant remained in their site at 5 or 8 months, based on Employment Verification Form data (2–3% of participants did not have a form submitted). Binary indicators for each bonus amount ($1000, $2000, $3000) are included, with the control group as the reference category. The model also includes randomization-block fixed effects, and standard errors are clustered at the site level.

[25] The differences in estimated turnover reductions across the three bonus amounts are not statistically distinguishable from one another. When the three bonus groups are pooled together as a single treatment (any bonus offer), bonus offers are estimated to cause a 1.7 percentage point decrease in turnover rates (statistically significant at the p=0.10 level).

than MSDE's 9.5% (Bassok et al., 2021). Several factors could explain why 8-month turnover was more modest in MSDE's ECSTRA study compared to Virginia's TRP. First, the TRP's 8-month window included the summer months, whereas the ECSTRA period did not.[26] In addition, ECSTRA applicants were required to hold an MDCC credential—a condition not present in TRP.

Figure 6. Effects of ECSTRA Bonus Offers on Educator Turnover at 5 and 8 Months



*Note: The following symbols indicate if the change in turnover estimate is statistically distinguishable from 0 (no change) at the following levels: + for 90% confidence, * for 95% confidence, ** for 99% confidence, and *** for 99.9% confidence. Confidence intervals shown are at the 90% confidence level. For details of the statistical model, see Footnote 24.*

MSDE's ECSTRA bonus offers lowered 8-month turnover by up to 1.7 points (from 9.5% to 7.8%, an 18 percent reduction), whereas Virginia's $1500 TRP bonus offers lowered turnover by 11.3 points (from 25.2% to 13.9%, a 45 percent reduction). This smaller impact in MSDE is perhaps expected, as a lower baseline turnover leaves less scope for significant improvement. Additionally, MSDE's credentialing requirement likely pre-selected early educators who were already more likely to remain in their roles, potentially reducing both their baseline turnover rates and their responsiveness to the retention bonus. We next consider whether certain subgroups within the ECSTRA RCT study were more responsive to bonuses than others. This may help policymakers consider responsive target audiences for future retention bonus programs.

[26] It is worth noting that there were differences in the types of ECE programs included in these studies. While both the TRP and ECSTRA studies examined turnover in center-based ECE programs, TRP also included school-based programs whereas ECSTRA instead included family home-based programs. However, these program differences are unlikely to account for the differences in the magnitude of effects between the two programs.

(Q6) Did Some Early Educators Benefit More from ECSTRA Bonuses?

While the ECSTRA Program resulted in modest reductions in overall turnover, there were more substantial turnover reductions among particular subpopulations of early educators. The analyses that follow group early educators based on key characteristics they reported on the Fall 2023 Baseline Survey (see Appendix C) in the months before ECSTRA began; it is therefore only possible to conduct these analyses for the 55% of ECSTRA RCT participants who responded to that survey.

Before presenting results for certain groups that did respond strongly to ECSTRA bonus offers, there were several educators characteristics that did *not* show differential patterns of ECSTRA bonus effects. For instance, there were no systematic differences in impacts based on participants' self-reported job satisfaction[27] or self-reported intentions to stay in their site[28] in the months leading up to the launch of ECSTRA. There were also no systematic differences by site type (centers versus family homes), site staff size, or early educator role type (e.g., site leaders versus teachers).

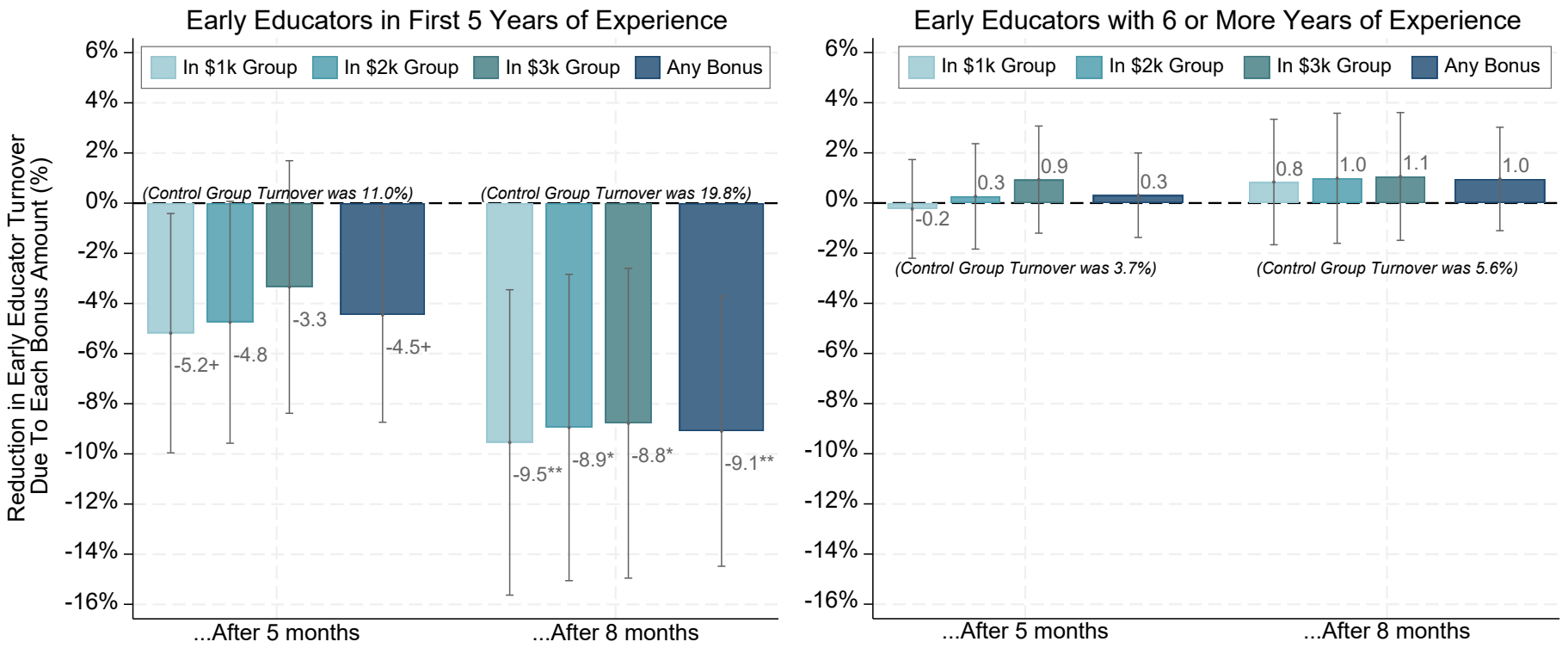
Strong ECSTRA Bonus Effects for Educators in the First 5 Years of Their Career

For early educators with five or fewer years of experience, we find substantial turnover impacts from all sizes of ECSTRA bonus offers. For simplicity, the following discussion focuses on 8-month outcomes. As shown in the left-hand panel of Figure 7, 19.8% of those in the control group left their site within 8 months—about one out of every five. By contrast, turnover rates were cut in half among those offered any amount of ECSTRA bonus. For instance, only 10.3% of those offered a $1000 ECSTRA bonus departed within 8 months, representing a large and statistically significant 9.5 percentage point reduction. In relative terms, turnover rates were cut nearly in half (reduced by 48 percent) in this group. Comparably large reductions occurred for the $2000 and $3000 bonus groups.[29]

In contrast, the right-hand panel of Figure 7 indicates that, among educators with six or more years of ECE experience, ECSTRA bonus offers produced no statistically significant changes in turnover. Taken together, these findings suggest that these retention bonuses are most impactful for early educators in their first few years in the profession.

[27] Respondents were asked, on the Fall 2023 Baseline Survey, how satisfied they were with the job overall. We compared respondents reporting not at all or a little bit with those reporting somewhat or very.
[28] Respondents were asked, on the Fall 2023 Baseline Survey, how likely they were to stay at their current site for the next 6 months, 1 year, and 3 years.
[29] The magnitude of turnover impacts across bonus amounts are not statistically distinguishable from one another.

Figure 7. Impacts of ECSTRA Bonuses on Turnover, by Years of ECE Experience



*Note: The following symbols indicate if the change in turnover estimate is statistically distinguishable from 0 (no change) at the following levels: + for 90% confidence, * for 95% confidence, ** for 99% confidence, and *** for 99.9% confidence. Confidence intervals shown are at the 90% confidence level. These estimates were produced by a statistical model in which the categories of educator experience levels were interacted with treatment status. For additional details of the statistical model used to generate these estimates, see Footnote 24.*

Early Educators Receiving Lower Wages at Baseline Had Larger ECSTRA Effects

Another possibility is that early educators who received lower hourly wages at baseline from their site would be more likely to benefit from a retention bonus. To examine this, we grouped ECSTRA RCT participants into the top- and bottom- half of the wage distribution, based on their self-report of hourly wages in the months just before ECSTRA began. Among those in the bottom 50% of wages, educators reported earning less than $18.75/hour, and the average hourly wage in this group was about $15/hour. In contrast, among those in the top 50%, educators reported earning between $18.76/hour and $55/hour, and the average hourly wage in this group was about $24/hour.

ECSTRA bonus impacts were indeed concentrated among lower-wage early educators, as shown in the left-hand panel of Figure 8: ECSTRA bonus offers reduced 8-month[30] turnover between 3.7 and 5.8 points, relative to the control group, wherein 14.5% had left their site within 8 months. These impacts are substantively large, representing between a 25 to 40 percent reduction in turnover. When all bonus amounts are considered together,[31] bonus offers reduced turnover by 4.5 points—about a 31 percent reduction in the turnover among lower-wage early educators. On the other hand, bonus offers had no impact on turnover among early educators in the top half of the wage distribution (right-hand panel of Figure 8). This suggests that retention offers may be more impactful among those early educators receiving lower pay at their sites.

Stronger ECSTRA Effects in Certain Regions

The research team also examined whether ECSTRA bonus offers varied in their effectiveness across Maryland's 13 licensing regions. Because each region's sample size is substantially smaller than the overall RCT sample,[32] we estimated a single, pooled effect of any bonus offer within each region. Notable results emerged in three locations—Baltimore City (Region 3), Howard County (Region 6), and the North Central Region (Region 11)—where 8-month turnover dropped by 9.1, 9.0, and 8.2 points, respectively, exceeding a 50 percent reduction in each case (Figure 9).[33] In other regions, bonus offers did not produce statistically significant changes in turnover. Interestingly, these three regions differ considerably in average income, racial/ethnic composition, urbanicity, and population size, indicating that ECSTRA's positive impact can arise under a variety of local conditions.

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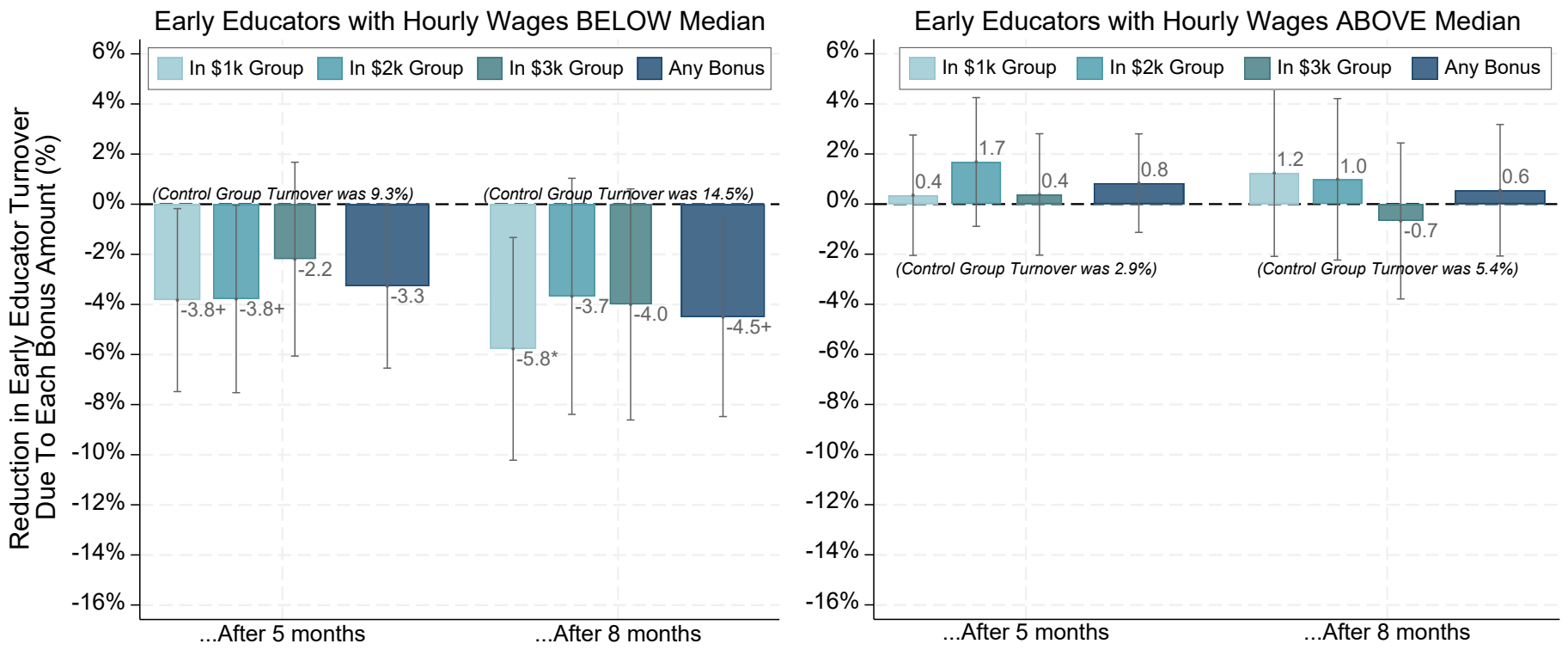
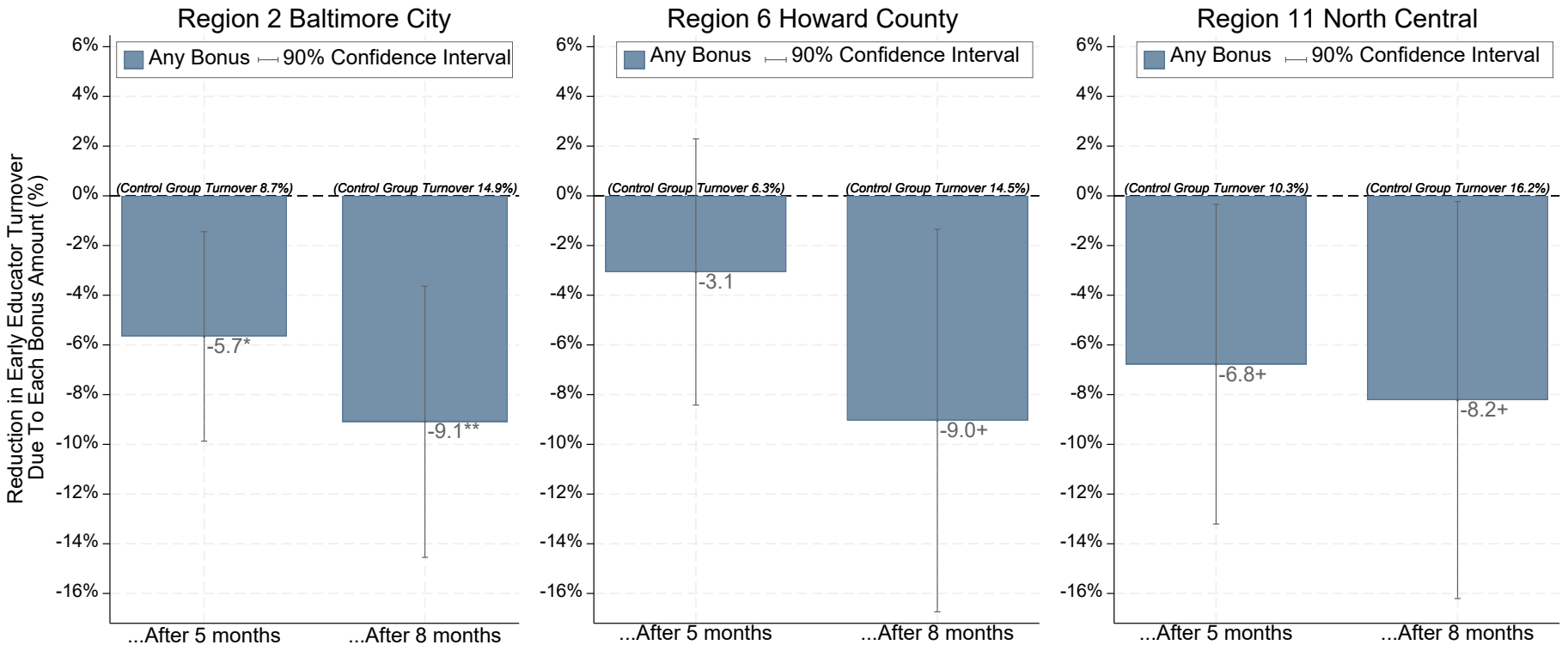
[30] Again, for simplicity we focus the discussion on 8-month turnover rates.
[31] There was not a clear relationship between the size of the bonus offer and how much turnover was reduced; the impacts across bonus sizes are not statistically distinguishable from one another.
[32] These reduced sample sizes induce imprecision in estimated results. To illustrate the point, in most regions, there were fewer than 100 ECSTRA RCT sample participants in the control group. Given that analyses have not generally shown systematic, differential effects on turnover based on bonus amount, we combine the three bonus categories into a single treatment group when estimating effects by region, to increase statistical power.
[33] In Baltimore City, estimated 8-month turnover was 14.9% in the control group, but only 5.8% in the group offered any ECSTRA retention bonus—a reduction of 9.1 percentage points (p=0.006). In Howard County, estimated 8-month turnover was 14.5% in the control group, but only 5.5% in the group offered any ECSTRA bonus—a reduction of 9.0 percentage points (p=0.053). In North Central Region 11, estimated 8-month turnover was 16.2% in the control group, but only 8.0% in the group offered any retention bonus—a reduction of 8.2 percentage points (p=0.091).

Figure 8. Impacts of ECSTRA Bonus Offers on Turnover, Separately for Low vs. High Hourly Wage Early Educators



*Note: The following symbols indicate if the change in turnover estimate is statistically distinguishable from 0 (no change) at the following levels: + for 90% confidence, * for 95% confidence, ** for 99% confidence, and *** for 99.9% confidence. Confidence intervals shown are at the 90% confidence level. These estimates were produced by a statistical model in which the categories of educator experience levels were interacted with treatment status. For additional details of the statistical model used to generate these estimates, see Footnote 24.*

Figure 9. Effects of the ECSTRA Bonus Program in Key Licensing Regions



*Note: The following symbols indicate if the change in turnover estimate is statistically distinguishable from 0 (no change) at the following levels: + for 90% confidence, * for 95% confidence, ** for 99% confidence, and *** for 99.9% confidence. Confidence intervals shown are at the 90% confidence level. For details of the statistical model used to generate these estimates, see Footnote 24.*

Conclusion

Maryland's ECSTRA Program provides valuable insights into how retention bonuses might stabilize segments of the ECE workforce under real-world funding and implementation constraints. By leveraging a random-assignment design, the pilot of the ECSTRA Program enabled researchers to estimate the causal effects of bonus offers on 5- and 8-month turnover. Although overall reduction was modest, we found it had particularly strong effects for key groups of educators that may be especially in need of supports and at a risk of leaving, including early career educators and educators receiving the lowest pay. The findings shed light on the nuances of how bonuses could shape educators' employment decisions in various contexts, offering a roadmap for future initiatives.

First, the results suggest that, while retention bonuses can indeed support workforce stability, their efficacy may hinge on how programs target participants. Requiring educators to hold an MDCC credential effectively limited participation to professionals who were already highly invested in the field. In turn, this requirement may have reduced the potential for large-scale turnover reductions, as a higher proportion of these credentialed educators likely would have stayed regardless of bonus offers. Nevertheless, the program's design still allowed for meaningful decreases in turnover among groups that are more susceptible to leaving, namely early educators with less experience and those earning lower wages. These subgroups showed turnover declines of as high as 9.5 points—cuts in turnover of up to 48 percent—reinforcing the idea that retention bonuses can be particularly compelling for newer, lower-paid staff.

Interestingly, we did not find consistent evidence that a $3000 bonus yielded stronger reductions in turnover than a $2000 bonus, despite the underlying theory that larger offers should provide a greater financial incentive to stay. This is somewhat surprising, given that prior research and program designs often assume a direct relationship between bonus size and retention gains. One possible explanation is that once the bonus amount surpasses a certain threshold, other factors—such as overall job satisfaction, work environment, or professional commitment—may play a more decisive role in an educator's decision to remain.

Third, while the ECSTRA Program primarily aimed to reduce turnover, the survey data reveal that educators had positive experiences of receiving an ECSTRA bonus in terms of their financial and emotional well-being. Bonus recipients reported paying down debts, buying groceries more comfortably, and meeting critical living expenses with less stress. They also expressed that receiving ECSTRA bonuses made them feel more valued and excited about their work. Such improvements in morale and self-perceived stability can be pivotal in retaining educators beyond any immediate financial incentive.

Nonetheless, the ECSTRA findings should be interpreted with several important caveats in mind. The requirement to hold an MDCC credential may have selected for educators who were especially committed to remaining in the field, effectively minimizing the pool of individuals who might otherwise have been considering leaving. As a result, the program's overall impact on the broader population—if expanded to all early educators—could differ. Moreover, although the research team's design allows for a robust estimate of causal effects, the study period took place

under particular economic and policy conditions, including infusion of temporary federal ARPA funds. Future replication studies could explore how bonuses function under differing labor market realities and funding landscapes.

The ECSTRA Program offers evidence that retention bonus programs can further reduce turnover and strengthen educators' sense of support and professional validation. Policymakers may wish to consider tailoring bonus eligibility requirements or enrollment strategies if the goal is to reach those most likely to benefit—particularly newer, lower-wage educators or regions with historically higher turnover. By applying targeted strategies and learning from the successes and limitations of ECSTRA, Maryland and other states can better leverage retention bonuses as a meaningful tool for building a stable, high-quality early childhood workforce.

Appendix A. Baseline Covariate Balance Table

Table A1. Baseline Covariate Balance, in Original Metrics and Standardized Cohen's d

Variable	Any Bonus Amount (Treatment Group) Mean	No Bonus (Control Group) Mean	Raw Difference	Cohen's d	T- / Z- statistic	p-value	N
Employee-Level Characteristics							
Responded to baseline survey*	54.9%	56.9%	-2.0%	0.040	-1.359	0.174	5446
Position*							
Site Leader	14.8%	15.8%	-1.0%	0.028	-0.655	0.512	5147
Teacher	26.7%	26.6%	0.1%	-0.002	-0.212	0.832	5324
Other Staff	10.9%	11.5%	-0.6%	0.020	-0.781	0.435	5446
Unknown	47.7%	46.1%	1.5%	-0.031	1.096	0.273	5207
Gender							
Woman	97.7%	98.1%	-0.4%	0.028	-0.982	0.326	5207
Man	2.3%	1.9%	0.4%	-0.028	0.982	0.326	5207
Race/Ethnicity*							
White	37.6%	38.8%	-1.3%	0.026	-1.328	0.184	5377
Black	28.8%	27.1%	1.7%	-0.039	1.739	0.082	5446
Asian	6.3%	5.6%	0.7%	-0.031	0.959	0.338	4678
Hispanic, any race	11.7%	11.0%	0.7%	-0.021	0.798	0.425	5266
Other	11.1%	11.6%	-0.5%	0.017	-0.537	0.591	5446
Unknown	4.5%	5.9%	-1.4%	0.065	-2.061	0.039	5291
Age*	42.5	42.5	0.0	0.001	0.129	0.897	5446
Hourly Wages*	$19.83	$20.24	-$0.41	0.066	-1.970	0.049	2579
ECE Experience (at Site)*	7.6	8.0	-0.5	0.061	-1.258	0.209	2858
ECE Experience (Overall)	12.6	13.5	-0.9	0.094	-1.956	0.051	2971
Has ECE Degree*	64.2%	64.4%	-0.2%	0.005	0.076	0.939	1547
Has at least BA Degree*	33.9%	34.3%	-0.4%	0.007	-0.348	0.728	3001
Is married and/or has partner*	58.3%	57.9%	0.3%	-0.007	0.046	0.963	2982
Works less than 40 hrs/wk*	21.4%	21.5%	0.0%	0.001	0.071	0.944	2832
Is satisfied with pay*	49.3%	50.5%	-1.2%	0.024	-0.542	0.588	2859
Intends to still work in 1 yr*	86.9%	87.3%	-0.4%	0.011	-0.246	0.806	2716
Site-Level Characteristics							
Site Type							
Childcare Center	60.6%	58.2%	2.4%	-0.049	--	--	1576
Letter of Compliance Facility	2.3%	4.4%	-2.1%	0.126	--	--	1576
Family Childcare Home	33.5%	33.7%	-0.2%	0.003			1576
Large Family Childcare Home	3.5%	3.7%	-0.1%	0.007			1576
Employees							
Total Employees	15.9	15.1	0.8	-0.057	1.334	0.182	1576
Credentialed Employees	5.7	5.4	0.3	-0.045	1.290	0.197	1576
EXCELS Participation	93.1%	92.4%	0.7%	-0.027	0.463	0.644	1576
EXCELS Rating	2.5	2.5	0.0	0.000	0.133	0.894	1415
Site Capacity (Y/N)							
Infant capacity	73.3%	72.3%	0.9%	-0.021	0.492	0.623	1576
Toddler capacity	75.3%	73.9%	1.4%	-0.032	0.692	0.489	1576
Preschool capacity	96.8%	94.5%	2.3%	-0.121	2.064	0.039	1576
School-age capacity	66.2%	63.2%	3.0%	-0.064	1.238	0.216	1576
Licensing Regions							
Anne Arundel County	6.6%	6.3%	0.4%	-0.014	--	--	1576
Baltimore City	12.2%	12.3%	-0.1%	0.004	--	--	1576
Baltimore County	13.7%	13.8%	-0.1%	0.003	--	--	1576
Prince George's County	9.4%	9.1%	0.2%	-0.009	--	--	1576
Montgomery County	18.4%	18.8%	-0.4%	0.009	--	--	1576
Howard County	7.0%	7.0%	0.0%	0.000	--	--	1576
Western Maryland	3.9%	5.2%	-1.3%	0.064	--	--	1576
Upper Shore	3.3%	3.1%	0.1%	-0.008	--	--	1576
Lower Shore	3.8%	2.3%	1.4%	-0.078	--	--	1576
Southern Tri Counties	7.5%	6.3%	1.2%	-0.046	--	--	1576
Harford and Cecil Counties	5.0%	6.3%	-1.2%	0.055	--	--	1576
Frederick County	5.7%	6.5%	-0.8%	0.035	--	--	1576
Carroll County	3.4%	2.9%	0.6%	-0.032	--	--	1576

*Note: "Treatment Group" refers to the group offered any bonus of any amount—$1000, $2000, or $3000. Randomization occurred at the site level. Blocks were created based on a combination of licensing region and site size, comprising a total of 27 blocks. * indicates that the variable was used to balance prior to randomization. "Other" position indicates includes co-teacher, assistant teacher, floater, or other role. If individuals are identified as Hispanic, they are included in the "Hispanic, any race" category. Wages were self-reported and are capped at $55/hour. Work experience is capped at 30 years. Satisfaction with pay reflects a survey item choice indicating either "somewhat satisfied" or "very satisfied" (the top two categories) on four-item Likert scale. Site type and licensing region were used to create the RCT randomization blocks, so results from models where randomization blocks are used as a fixed effect are unavailable due to collinearity.*

Appendix B. Follow-Up Survey Representativeness

Among the 5,371 ECSTRA RCT participants invited to take the August Follow-Up Survey (N=5,371),[34] the survey response rate was 67% (N=3,605).[35] Because not all ECSTRA RCT participants responded, any analyses that rely on Follow-Up Survey responses will necessarily be limited to this group of survey respondents. In this Appendix B, we consider the extent to which the subset of the ECSTRA RCT sample that responded to the Follow-Up Survey are similar to the full ECSTRA RCT sample. We find that the demographics of these two groups are quite similar (Question B1). We also find that, while the control group had a slightly lower Follow-Up Survey response rate (61%), all four groups' response rates were between 61% and 70% (Question B2). Finally, we also find that, even within each of the four treatment groups, the characteristics of the subsets of Follow-Up Survey respondents are quite similar to each group's full sample (Question B3). Taken together, these analyses suggest that analyses that utilize Follow-Up Survey data and thus are limited to that population may be a representation of what findings would be like for the full ECSTRA RCT sample.

(B1) How Similar Were ECSTRA RCT Participants Who Took the Follow-Up Survey to the Full Population of ECSTRA Study Participants?

We found that, for the most part, there are similarities in the demographic and site-level characteristic makeup for the ECSTRA RCT participants as a whole compared to those who responded. With only 67% of ECSTRA RCT participants responding, it is important to determine if the sample that participated in the Follow-Up Survey was reflective of all ECSTRA RCT participants. To check for a close match in representation, we consider the demographics of the ECSTRA RCT participants who were invited to take part in the survey compared to the demographics of those who completed the survey. When considering demographic matching between the ECSTRA RCT participants as a whole versus those who responded to the Follow-Up Survey, we tested the difference in mean values for statistical differences. A complete comparison between the ECSTRA RCT participants as a whole and those who took part in the Follow-Up Survey can be found in Appendix Table B1.

The results in Table B1 show that, in most cases, the representation is balanced. The cases in which they are not include indicators for female, White, Hispanic, site leader, licensed center, and registered site. However, these differences, while significant, are only marginally so. Ideally, we would prefer a higher response rate, but most of the gender and race representation is balanced between those who responded and the entire group. Rarely is there a difference greater than 1-2 points between demographics and site characteristics. This increases confidence in the applicability of the responses to ECSTRA questions from the Follow-Up Survey.

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[34] A handful of early educators participated in the ECSTRA Program in two sites, because they were eligible in two sites. For these individuals, the research team elected to send them only one invitation to complete the August 2024 Follow-Up Survey. As a result, the number of unique ECSTRA RCT participants invited to take the Follow-Up Survey (N=5,371) is very slightly lower than the number of randomized unit in the ECSTRA RCT Sample (N=5,446).

[35] For more information on the Follow-Up Survey, see this implementation report.

Table B1. Demographics of ECSTRA Participants and Subset Who Completed the Follow-Up Survey

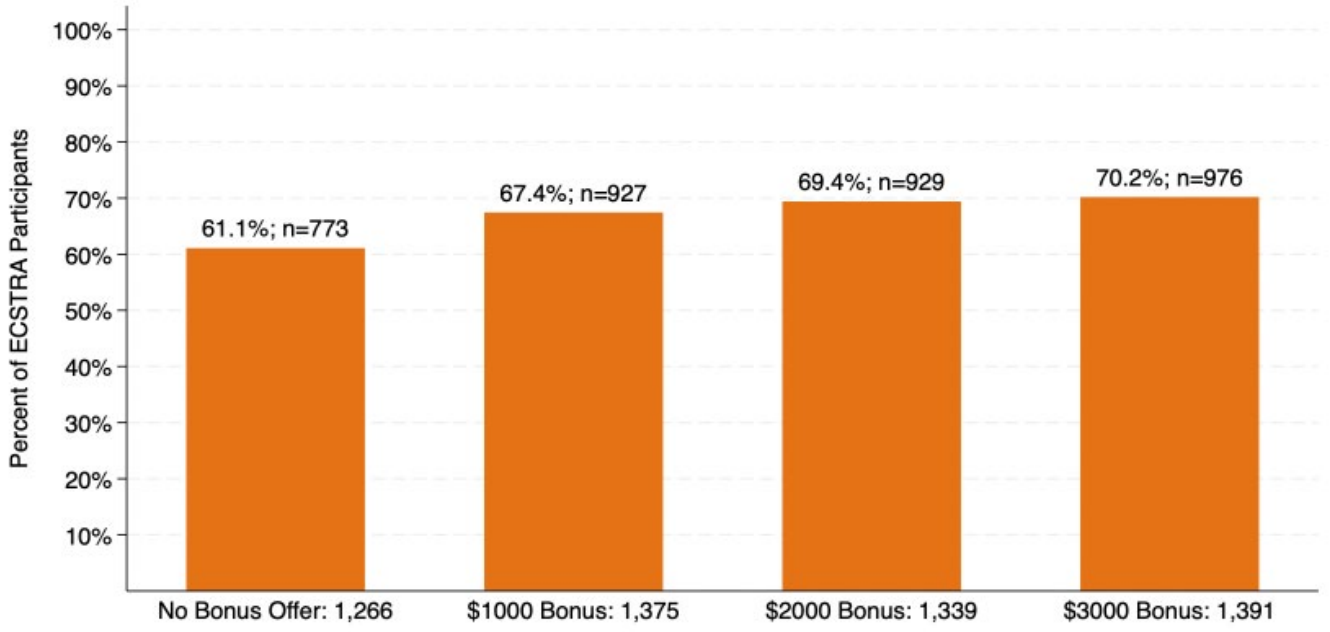
	ECSTRA RCT Sample (N=5,446)		Subset Who Completed Follow-Up Survey (N=3,605)		Differences in Means
	Mean	*(% Missing)*	Mean	*(% Missing)*	
Employee Demographics		*(0.0%)*		*(0.0%)*	
Age	42.7		42.2		Similar
Female	97.9%		98.4%		Statistical Difference *
White	36.7%		44.0%		Statistical Difference **
Black	27.2%		31.2%		Similar
Asian	5.9%		7.2%		Similar
Hispanic	14.7%		13.1%		Statistical Difference *
Other/Multi Race	10.8%		4.5%		Similar
Unknown Race	4.6%		0.0%		Similar
Employee Background		*(0.0%)*		*(0.0%)*	
Credentialed (as of Oct 2023)	100.00%		100.0%		Similar
Site Leader	22.0%		23.0%		Statistical Difference *
Site Characteristics Averaged Across Educators		*(0.1%)*		*(2.9%)*	
Large Home Site	1.6%		1.4%		Similar
Letters of Compliance Site	2.6%		2.7%		Similar
Licensed Center	85.6%		84.1%		Statistical Difference *
Registered Site	10.3%		11.8%		Statistical Difference **
Offers Infant Care	73.2%		72.3%		Similar
Offers Toddler Care	75.6%		74.5%		Similar
Offers Preschool Care	98.5%		98.2%		Similar
Offers School Age Care	65.4%		64.2%		Similar
EXCELS Rated	95.4%		94.8%		Similar
Licensing Region Averaged Across Educators		*(0.1%)*		*(2.9%)*	
Anne Arundel County	7.0%		7.2%		Similar
Baltimore City	9.4%		9.1%		Similar
Baltimore County	13.4%		14.3%		Similar
Prince George's County	7.6%		6.9%		Similar
Montgomery County	23.7%		21.6%		Similar
Howard County	6.3%		6.7%		Similar
Western Maryland	4.4%		4.5%		Similar
Upper Shore	2.3%		2.5%		Similar
Lower Shore	3.9%		4.2%		Similar
Southern Tri Counties	5.9%		6.1%		Similar
Harford and Cecil Counties	5.1%		5.5%		Similar
Frederick County	6.4%		6.2%		Similar
Carroll County	4.6%		5.1%		Similar

*Note: To determine if the mean characteristics of the Follow-Up Survey respondents were statistically distinguishable from the mean characteristics in the full population of RCT study participants, we specified a series of unconditional OLS regression models, each with one of the characteristics shown above as an outcome (errors clustered at the site level). We then conducted post-hoc tests of the null hypothesis that each mean characteristic (the intercept) was statistically distinguishable from the RCT Sample population mean. Statistical significance: * for p<.05, ** for p<.01, and *** for p<.001.*

(B2) Were ECSTRA RCT Participants Equally Likely to Respond to the Follow-Up Survey?

As shown in Figure B1, all four randomized groups of ECSTRA RCT participants had Follow-Up Survey response rates between 61% and 70%. It is worth noting that the control group had a slightly lower response rate (61%) than those in the groups randomly selected for $1000, $2000, or $3000 ECSTRA bonus offers (67% to 70%). This is perhaps expected because, after the control group was notified in November 2023 that they had were *not* randomly selected to receive ECSTRA bonus offers, there was no additional direct engagement with this group. It is therefore not surprising that they were slightly less likely to respond to a request for a Follow-Up Survey nearly ten months later.

Figure B1. Percent of ECSTRA Study Participants Who Responded to the August 2024 Follow-Up Survey



(B3) Were All Four ECSTRA Study Groups Well-Represented by the August 2024 Follow-Up Survey Respondents?

Similar to the overall sample, the representation of Follow-Up Survey respondents within each bonus group matched in most cases. There were some demographics and site characteristics that were imbalanced between an entire bonus group of ECSTRA RCT participants and Follow-Up Survey respondents, as shown in Table B2. We looked for differences within each treatment group to consider if there was a demographic and site characteristic balance between the participants in each treatment group and those within the treatment group who completed the Follow-Up Survey.

Table B2. Comparison of Demographics for ECSTRA Participants and Follow-Up Survey Respondents by Treatment Group

	Control Group			$1,000 Group			$2,000 Group			$3,000 Group		
	All (N=1,290)	Responders (N=773)	Differences in Means	All (N=1,388)	Responders (N=927)	Differences in Means	All (N=1,355)	Responders (N=929)	Differences in Means	All (N=1,413)	Responders (N=976)	Differences in Means
Employee Demographics												
Age	42.8	42.3	Similar	43.1	42.6	Similar	43.0	42.4	Similar	42.0	41.6	Similar
Female	98.1%	98.2%	Similar	98.4%	99.1%	Statistical Difference *	97.5%	98.2%	Similar	97.7%	98.0%	Similar
White	37.8%	44.9%	Statistical Difference *	37.2%	45.3%	Statistical Difference **	34.2%	41.6%	Statistical Difference **	37.7%	44.6%	Statistical Difference *
Black	26.0%	29.5%	Similar	26.7%	31.0%	Similar	29.7%	33.8%	Similar	26.4%	30.2%	Similar
Asian	5.3%	6.9%	Similar	6.7%	8.3%	Similar	4.9%	6.0%	Similar	6.7%	7.7%	Similar
Hispanic	13.9%	13.7%	Similar	13.5%	11.2%	Similar	15.7%	14.2%	Similar	15.7%	13.2%	Similar
Other	11.4%	5.0%	Statistical Difference ***	11.0%	4.2%	Statistical Difference ***	10.5%	4.4%	Statistical Difference ***	10.5%	4.3%	Statistical Difference ***
Unknown Race	5.6%	0.0%	Similar	4.9%	0.0%	Similar	5.0%	0.0%	Similar	3.0%	0.0%	Similar
Employee Background												
Credentialed (as of October 2023)	100.0%	100.0%	Similar	100.0%	100.0%%	Similar	100.0%	100.0%	Similar	100.0%	100.0%	Similar
Site Leader	22.6%	24.4%	Similar	22.2%	22.2%	Similar	21.7%	22.9%	Similar	21.5%	22.7%	Similar
Site Characteristics Averaged Across Educators												
Large Home Site	1.9%	2.3%	Similar	1.4%	0.8%	Statistical Difference *	1.7%	1.3%	Similar	1.5%	1.3%	Similar
Letters of Compliance Site	3.9%	4.4%	Similar	2.9%	3.2%	Similar	2.4%	1.6%	Similar	1.2%	1.7%	Similar
Licensed Center	83.7%	81.6%	Similar	85.2%	85.3%	Similar	85.5%	85.1%	Similar	87.8%	85.5%	Similar
Registered Site	10.5%	11.7%	Similar	10.6%	10.7%	Similar	10.5%	11.9%	Similar	9.6%	11.6%	Similar
Offers Infant Care	72.0%	69.4%	Similar	75.9%	75.1%	Similar	68.6%	67.3%	Similar	75.9%	75.6%	Similar
Offers Toddler Care	72.9%	70.5%	Similar	76.4%	76.1%	Similar	74.3%	72.5%	Similar	78.5%	77.3%	Similar
Offers Preschool Care	97.9%	96.9%	Similar	99.2%	98.9%	Similar	98.4%	98.0%	Similar	98.5%	98.0%	Similar
Offers School Age Care	61.2%	61.6%	Similar	71.7%	68.8%	Similar	60.8%	58.8%	Similar	67.4%	66.0%	Similar
EXCELS Rated	95.3%	94.8%	Similar	95.0%	94.4%	Similar	95.8%	95.0%	Similar	95.4%	93.9%	Similar
Licensing Region Averaged Across Educators												
Anne Arundel County	6.8%	7.2%	Similar	7.7%	8.3%	Similar	6.1%	5.9%	Similar	7.3%	6.8%	Similar
Baltimore City	10.9%	10.5%	Similar	7.9%	7.9%	Similar	9.8%	10.2%	Similar	9.1%	8.6%	Similar
Baltimore County	13.2%	14.5%	Similar	13.1%	14.0%	Similar	12.3%	12.5%	Similar	15.1%	16.1%	Similar
Prince George's County	7.6%	6.4%	Similar	8.4%	6.9%	Similar	7.6%	7.1%	Similar	6.9%	7.6%	Similar
Montgomery County	23.6%	22.7%	Similar	22.0%	19.6%	Similar	25.0%	24.4%	Similar	24.1%	20.7%	Similar
Howard County	5.4%	4.8%	Similar	6.1%	6.6%	Similar	7.1%	7.5%	Similar	6.7%	7.3%	Similar
Western Maryland	4.5%	4.0%	Similar	4.8%	4.7%	Similar	4.3%	3.9%	Similar	3.9%	4.8%	Similar
Upper Shore	3.4%	3.9%	Similar	2.8%	3.1%	Similar	1.6%	2.1%	Similar	1.3%	1.5%	Similar
Lower Shore	1.4%	1.9%	Similar	4.7%	5.3%	Similar	5.3%	5.6%	Similar	4.0%	4.1%	Similar
Southern Tri Counties	5.6%	6.3%	Similar	5.9%	6.0%	Similar	5.6%	5.0%	Similar	6.6%	6.8%	Similar
Harford and Cecil Counties	6.0%	6.1%	Similar	4.4%	5.6%	Similar	4.9%	5.0%	Similar	5.2%	5.4%	Similar
Frederick County	8.8%	8.4%	Similar	6.1%	5.9%	Similar	6.0%	5.9%	Similar	4.9%	4.9%	Similar
Carroll County	2.9%	3.5%	Similar	6.1%	6.1%	Similar	4.4%	4.9%	Similar	5.0%	5.4%	Similar

*Note: To determine if the mean characteristics of the Follow-Up Survey respondents by treatment group were statistically distinguishable from the mean characteristics in the full population of RCT study participants, we specified a series of OLS regression models conditional upon treatment status, each with one of the characteristics shown above as an outcome (errors clustered at the site level). We then conducted post-hoc tests of the null hypothesis that each mean characteristic (the intercept) was statistically distinguishable from the RCT Sample population mean. Statistical significance: * for p<.05, ** for p<.01, and *** for p<.001*

In the control group, the differences in representation occurred in races of White and Other. In the $1000 bonus group, there were differences in the indicator for female, the races White and Other, and the indicator for large home sites. For the $2000 and $3000 bonus groups, differences existed among the races for White and Other.

While there are many areas of similarities for the Follow-Up Survey respondents and ECSTRA RCT participants as a whole, it is important to acknowledge areas where the representation is different. There is a possibility when we see differences in the respondent group from all ECSTRA RCT participants that answers may not be as applicable those who did not take the survey, however these differences are infrequent and often of low significance.

Appendix C. ECSTRA RCT Study Sample Compared to the Subset Who Responded to the Baseline Survey

In August 2023, the UVA research team launched a Baseline Survey, which was sent to a purposive sample of approximately 25,000 employes in licensed childcare sites, including (but not limited to) all 12,994 employees who had ever had an MDCC credential (as of June 2023).[36] Shortly thereafter, MSDE began accepting and processing applications to participate in the ECSTRA Program—a program for which a main eligibility requirement was having a valid MDCC credential. Both the Baseline Survey and ECSTRA application window closed on October 4, 2023. By November 15, 2024, 5,446 individuals were notified that they were part of the ECSTRA RCT study sample. By making the MDCC credential a component of eligibility for both the Baseline Survey and ECSTRA participation, it was anticipated that the vast majority of the ECSTRA RCT study sample would have received an invitation to complete the Baseline Survey.[37]

For the 5,446 ECSTRA RCT sample, the Baseline Survey response rate was 55% (2,987 of 5,446). Any analyses that rely on Baseline Survey responses will necessarily be limited to this subgroup of survey respondents. In Appendix C, we consider the extent to which the subset of the ECSTRA RCT sample that responded to the Baseline Survey is similar to the full ECSTRA RCT sample. We find that the demographics of these two groups are quite similar (Question C1). We also find that all four treatment groups' response rates were similar—between 60% and 64% (Question C2). Finally, we also find that, even within each of the four treatment groups, the characteristics of the subsets of Baseline Survey respondents are quite similar to each treatment group's full sample (Question C3). Taken together, this information suggests that analyses using the Baseline Survey data—and thus are limited to that subpopulation—may be a representation of what findings would be like for the full ECSTRA RCT sample.

(C1) How Similar Were ECSTRA RCT Study Participants Who Took the Baseline Survey to the Full Population of ECSTRA RCT Study Participants?

We found that, for the most part, there are similarities in the educator- and site-level characteristics of the ECSTRA RCT sample as a whole compared to those who responded to the Baseline Survey. Since only 55% of the ECSTRA RCT sample completed the Baseline Survey, it is important to determine if that subset was reflective of the full ECSTRA RCT sample. To check for a close match in representation, we consider the demographics of the ECSTRA RCT study participants compared to the subset of Baseline Survey respondents (Table C1). We studied each group for statistical differences.

[36] For more information on the Baseline Survey, see this implementation report.
[37] Ultimately, 89% (N=4,837) of the 5,446 employees became part of the ECSTRA RCT sample had received an invitation to complete the Baseline Survey in August 2023.

Table C1. Characteristics of ECSTRA RCT Sample and Subset Who Completed the Baseline Survey and Those Participants who Completed the Baseline Survey

	ECSTRA RCT Sample (N=5,446)		ECSTRA Baseline Survey Responders (N=2,987)		Differences in Means
	Mean	*(% Missing)*	Mean	*(% Missing)*	
Employee Demographics		*(0.0%)*		*(0.0%)*	
Age	42.7		43.1		Statistical Difference **
Female	97.9%		98.8%		Statistical Difference ***
White	36.7%		43.4%		Statistical Difference **
Black	27.2%		29.4%		Similar
Asian	5.9%		5.7%		Similar
Hispanic	14.7%		14.1%		Similar
Other/Multi Race	10.8%		7.4%		Similar
Unknown Race	4.6%		0.0%		Similar
Employee Background		*(0.0%)*		*(0.0%)*	
Credentialed (as of October 2023)	100.0%		100.0%		Similar
Site Leader	22.0%		24.0%		Statistical Difference **
Site Characteristics Averaged Across Educators		*(0.1%)*		*(0.7%)*	
Large Home Site	1.6%		1.4%		Similar
Letters of Compliance Site	2.6%		3.0%		Similar
Licensed Center	85.6%		83.6%		Statistical Difference *
Registered Site	10.3%		12.0%		Statistical Difference **
Offers Infant Care	73.2%		71.5%		Similar
Offers Toddler Care	75.6%		73.3%		Similar
Offers Preschool Care	98.5%		98.7%		Similar
Offers School Age Care	65.4%		64.7%		Similar
EXCELS Rated	95.4%		95.3%		Similar
Licensing Region Averaged Across Educators		*(0.1%)*		*(0.7%)*	
Anne Arundel County	7.0%		7.3%		Similar
Baltimore City	9.4%		9.2%		Similar
Baltimore County	13.4%		14.2%		Similar
Prince George's County	7.6%		7.0%		Similar
Montgomery County	23.7%		21.6%		Similar
Howard County	6.3%		6.4%		Similar
Western Maryland	4.4%		4.6%		Similar
Upper Shore	2.3%		2.9%		Similar
Lower Shore	3.9%		4.1%		Similar
Southern Tri Counties	5.9%		6.0%		Similar
Harford and Cecil Counties	5.1%		6.0%		Similar
Frederick County	6.4%		6.0%		Similar
Carroll County	4.6%		4.7%		Similar

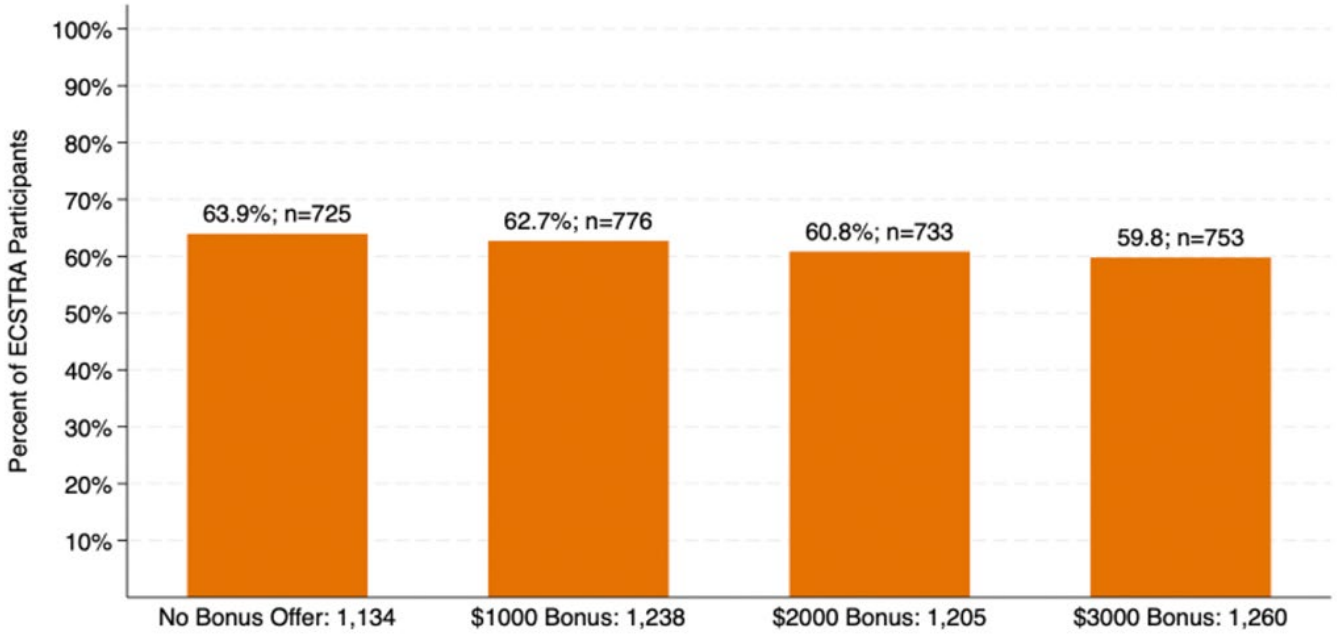
*Note: To determine if the mean characteristics of the Baseline Survey respondents were statistically distinguishable from the mean characteristics in the full population of RCT study participants, we specified a series of unconditional OLS regression models, each with one of the characteristics shown above as an outcome (errors clustered at the site level). We then conducted post-hoc tests of the null hypothesis that each mean characteristic (the intercept) was statistically distinguishable from the RCT Sample population mean. Statistical significance: * for p<.05, ** for p<.01, and *** for p<.001.*

The results in Table C1 show that, in most cases, the characteristics of the two groups are quite similar. Rarely is there a difference greater than 2-3 percentage points. In some cases, there are differences *statistically* different from one another, however the substantive differences generally remain small. The one exception is for race/ethnicity; while 36.7% of the ECSTRA RCT sample was White, a slightly higher percentage (43.4%) of the Baseline Survey respondents were White. In general, these findings increase confidence that findings limited to the subset of Baseline Survey respondents might be similar to findings in the full ECSTRA RCT sample.

(C2) Were ECSTRA RCT Study Participants Equally Likely to Respond to the Baseline Survey?

All four randomized groups of ECSTRA RCT study participants had Baseline Survey response rates between 60% and 64% (Figure C1). It is worth noting that the group that would later be assigned to the $3000 bonus group had a slightly lower response rate (60%) than those in the groups randomly selected for other groups (61% to 64%).

Figure C1. Baseline Survey Response Rates, by ECSTRA RCT Study Treatment Groups



(C3) Were All Four ECSTRA RCT Study Groups Well-Represented by the August 2024 Baseline Survey Respondents?

Each of the four RCT study treatment groups (no bonus offer, $1000, $2000, or $3000 offer) appear to be well-represented by the subset of each that responded to the Baseline Survey. There were some characteristics between the complete ECSTRA Bonus Offer groups and their subsets of Baseline Survey respondents (Table C2). We looked for differences within each treatment group to consider if there was a demographic and site characteristic balance between the participants who would later be assigned to each treatment group and those within that treatment group who completed the Baseline Survey.

Table C2. Characteristics of ECSTRA RCT Treatment Groups Compared to the Subset of each that Responded to the Baseline Survey

	Control Group			$1,000 Group			$2,000 Group			$3,000 Group		
	All (N=1,290)	Responders (N=725)	Differences in Means	All (N=1,388)	Responders (N=776)	Differences in Means	All (N=1,355)	Responders (N=733)	Differences in Means	All (N=1,413)	Responders (N=753)	Differences in Means
Employee Demographics												
Age	42.8	43.6	Similar	43.1	43.1	Similar	43.0	43.4	Similar	42.0	42.4	Similar
Female	98.1%	99.2%	Statistical Difference **	98.4%	99.4%	Statistical Difference **	97.5%	98.5%	Statistical Difference *	97.7%	98.1%	Similar
White	37.8%	44.5%	Statistical Difference *	37.2%	44.4%	Statistical Difference **	34.2%	39.7%	Similar	37.7%	45.0%	Statistical Difference *
Black	26.0%	28.3%	Similar	26.7%	31.6%	Statistical Difference *	29.7%	32.6%	Similar	26.4%	25.2%	Similar
Asian	5.3%	5.1%	Similar	6.7%	5.4%	Similar	4.9%	4.6%	Similar	6.7%	7.4%	Similar
Hispanic	13.9%	12.6%	Similar	13.5%	12.1%	Similar	15.7%	15.8%	Similar	15.7%	15.7%	Similar
Other	11.4%	9.5%	Similar	11.0%	6.5%	Statistical Difference ***	10.5%	7.2%	Statistical Difference **	10.5%	6.6%	Statistical Difference ***
Unknown Race	5.6%	0.0%	Similar	4.9%	0.0%	Similar	5.0%	0.0%	Similar	3.0%	0.0%	Similar
Employee Background												
Credentialed (as of October 2023)	100.0%	100.0%	Similar	100.0%	100.0%	Similar	100.0%	100.0%	Similar	100.0%	100.0%	Similar
Site Leader	22.6%	23.9%	Similar	22.2%	25.0%	Similar	21.7%	23.1%	Similar	21.5%	24.1%	Similar
Characteristics Averaged Across Educators												
Large Home Site	1.9%	1.7%	Similar	1.4%	1.2%	Similar	1.7%	1.2%	Similar	1.5%	1.5%	Similar
Letters of Compliance Site	3.9%	4.3%	Similar	2.9%	3.5%	Similar	2.4%	2.7%	Similar	1.2%	1.3%	Similar
Licensed Center	83.7%	81.3%	Similar	85.2%	83.1%	Similar	85.5%	84.4%	Similar	87.8%	85.8%	Similar
Registered Site	10.5%	12.8%	Similar	10.6%	12.3%	Similar	10.5%	11.7%	Similar	9.6%	11.3%	Similar
Offers Infant Care	72.0%	69.3%	Similar	75.9%	75.5%	Similar	68.6%	68.4%	Similar	75.9%	72.4%	Similar
Offers Toddler Care	72.9%	70.2%	Similar	76.4%	76.2%	Similar	74.3%	71.2%	Similar	78.5%	75.2%	Similar
Offers Preschool Care	97.9%	98.2%	Similar	99.2%	99.1%	Similar	98.4%	98.9%	Similar	98.5%	98.5%	Similar
Offers School Age Care	61.2%	61.7%	Similar	71.7%	70.2%	Similar	60.8%	59.5%	Similar	67.4%	66.8%	Similar
EXCELS Rated	95.3%	94.9%	Similar	95.0%	96.1%	Similar	95.8%	94.9%	Similar	95.4%	95.4%	Similar
Licensing Region Averaged Across Educators												
Anne Arundel County	6.8%	7.4%	Similar	7.7%	8.4%	Similar	6.1%	5.6%	Similar	7.3%	7.5%	Similar
Baltimore City	10.9%	11.7%	Similar	7.9%	8.3%	Similar	9.8%	8.9%	Similar	9.1%	8.2%	Similar
Baltimore County	13.2%	12.9%	Similar	13.1%	14.0%	Similar	12.3%	13.6%	Similar	15.1%	16.3%	Similar
Prince George's County	7.6%	7.2%	Similar	8.4%	7.4%	Similar	7.6%	7.1%	Similar	6.9%	6.2%	Similar
Montgomery County	23.6%	19.1%	Similar	22.0%	18.9%	Similar	25.0%	26.3%	Similar	24.1%	22.2%	Similar
Howard County	5.4%	5.4%	Similar	6.1%	6.6%	Similar	7.1%	6.6%	Similar	6.7%	6.9%	Similar
Western Maryland	4.5%	5.5%	Similar	4.8%	5.3%	Similar	4.3%	3.3%	Similar	3.9%	4.2%	Similar
Upper Shore	3.4%	4.4%	Similar	2.8%	3.6%	Similar	1.6%	1.6%	Similar	1.3%	1.9%	Similar
Lower Shore	1.4%	1.4%	Similar	4.7%	5.2%	Similar	5.3%	5.9%	Similar	4.0%	3.9%	Similar
Southern Tri Counties	5.6%	5.3%	Similar	5.9%	6.1%	Similar	5.6%	5.3%	Similar	6.6%	7.1%	Similar
Harford and Cecil Counties	6.0%	7.9%	Similar	4.4%	5.6%	Similar	4.9%	4.8%	Similar	5.2%	5.8%	Similar
Frederick County	8.8%	8.5%	Similar	6.1%	5.3%	Similar	6.0%	5.6%	Similar	4.9%	4.9%	Similar
Carroll County	2.9%	3.3%	Similar	6.1%	5.4%	Similar	4.4%	5.2%	Similar	5.0%	4.9%	Similar

*Note: To determine if the mean characteristics of the Baseline Survey respondents by treatment group were statistically distinguishable from the mean characteristics in the full population of RCT study participants, we specified a series of OLS regression models conditional upon treatment status, each with one of the characteristics shown above as an outcome (errors clustered at the site level). We then conducted post-hoc tests of the null hypothesis that each mean characteristic (the intercept) was statistically distinguishable from the RCT Sample population mean. Statistical significance: * for p<.05, ** for p<.01, and *** for p<.001.*

In the control group, the differences in representation occurred primarily in females and the indicator for White. In the $1000 bonus group, there were differences in the indicator for female, and the races White, Black, and Other. For the $2000 bonus groups, differences existed among the indicator for female and Other race. For the $3000 bonus groups, differences existed among the races for White and Other.

Overall, the subset of the ECSTRA RCT study sample who responded to the Baseline Survey generally appear to be quite similar to, and representative of, the RCT sample as a whole. Nonetheless, it is important to acknowledge that analyses that rely on Baseline Survey data necessarily exclude about 40% of the RCT Sample.

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