

Technical Report

**HELPING PARENTS NAVIGATE THE EARLY
CHILDHOOD ENROLLMENT PROCESS:
EXPERIMENTAL EVIDENCE FROM
NEW ORLEANS**

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Helping parents navigate the early childhood education enrollment process:

Experimental evidence from New Orleans

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Abstract

Enrolling in publicly funded early childhood education involves searching for programs, applying, verifying eligibility, and registering with the program. Many families do not complete this process, despite demonstrated interest. In this study, we assessed support for families as they verify eligibility as a means for increasing enrollment completion rates. Working with district administrators, we randomly assigned families to receive either: (1) the district's usual, modest communications, (2) the usual communications plus weekly text-message reminders with a formal tone, or (3) the usual communications plus weekly personalized, friendly text-message reminders. Text-message reminders increased verification rates by seven percentage points (regardless of tone), and personalized messages increased enrollment rates for some groups. Exchanges between parents and administrators revealed the obstacles parents confronted.

Keywords: early childhood, education policy, parents and families, experimental design, mixed methods

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Public investment in early childhood education (ECE) has risen substantially over the past two decades (Friedman-Krauss et al., 2019), but the process of finding and enrolling in ECE programs remains difficult for many families (Bassok, Magouirk, Markowitz, & Player, 2018). Applicants to publicly funded programs often confront a multi-step process—search, apply, verify eligibility, and register—that demands sustained attention in navigating a complex set of requirements. Research from K-12 and higher education indicates that complexity in the choice and enrollment processes can result in poor outcomes, such as enrolling in undesired programs or not enrolling at all (Bettinger, Long, Oreopoulos, & Sanbonmatsu, 2012; Klasik, 2012; Schneider, Teske, & Marschall, 2000). Similar obstacles exist for families choosing ECE programs, though the ECE choice process has received less attention from researchers. These obstacles may be particularly burdensome—and consequential—for low-income families.

Using a randomized controlled trial (RCT), we examined a text-messaging intervention designed to help low-income parents in New Orleans verify eligibility for a publicly funded ECE seat (a necessary but insufficient step for enrolling). Through the city’s unified enrollment system, OneApp, parents request seats in publicly funded ECE programs. These seats are generally targeted to children from low-income families. As a result, ECE applicants must provide documents, in person, to verify their eligibility. In 2016-17, about 35 percent of the families who submitted an ECE application through the OneApp did not complete the verification step. These families demonstrated their desire for a placement in a publicly funded ECE program and then lost that opportunity by not completing verification.ⁱ

We conducted this RCT in partnership with the district office that oversees OneApp.ⁱⁱ Our aim was to help them address barriers in the ECE enrollment process. This RCT focused on the verification step of that process because: (1) district officials identified verification as a key

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barrier to program access; (2) verification occurs after parents submit an online application with up-to-date phone numbers, making a text-message RCT feasible; and (3) we can observe applicants' verification status in the district's data system. Drawing on research showing that personalized reminders (Castleman & Page, 2016; Dechausay & Anzelone, 2016) and supportive interactions (Bettinger et al., 2012; Castleman & Page, 2015) can improve the rates at which people complete complex tasks, we sought a low-cost intervention to improve verification rates. We used text messages, which, at relatively low cost, have demonstrated potential for changing behaviors (Castleman & Page, 2015; Dale & Strauss, 2009; Doss, Fahle, Loeb, & York, 2018; S. E. Mayer, Kalil, Oreopoulos, & Gallegos, 2018; York, Loeb, & Doss, 2018).

We randomly assigned parents to one of three groups after they submitted an application but before they completed verification. Group 1 (n=414 parents), the control group, received the district's past communications: formal, weekly email reminders to verify eligibility, up to five text message alerts for weekend verification events, and one "robocall" reminder. Group 2 (n=400) received the same communications plus weekly text message reminders to verify, also formal in tone (e.g., "Your child's OneApp is incomplete. The next step is to verify eligibility. Submit required documents to finish your OneApp."). Group 3 (n=410) received the same messages as Group 2 but with a different tone. Their messages were personalized and informal, and encouraged two-way communicationⁱⁱⁱ with a friendly staff member (e.g., "Hi, it's Ashley... I want to make sure [Child's name] doesn't lose her spot for next year! Text me if you'd like help finishing the OneApp!"). "Ashley" also sent reminder messages the day before a verification event. These groups allow for substantively important treatment contrasts. Comparisons of Groups 1 and 2 show the effects of providing additional reminders via text message. Comparisons of Groups 2 and 3 shows the effects of government making its outreach

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friendly, personalized, and conversational rather than bureaucratic and unidirectional. Finally, the unique combination of Head Start and school-based state pre-K programs in the same application system allows us to examine differential effects of the intervention on applicants to programs with different requirements and verification procedures.

Results indicate that a low-cost text message intervention can help parents overcome the eligibility verification barrier in the ECE enrollment process. Parents who received the text messages, regardless of personalization, were seven percentage points more likely to complete verification than parents in the control group (67% versus 60%, $p < .05$).^{iv} Another outcome of interest is whether families enrolled in an ECE program. The personalized texts—but not the formal texts—yielded higher rates of program enrollment in the following school year (60% versus 55%, $p < .10$).^v Effects were particularly large for parents who applied only to public pre-K programs (and no Head Start programs).^{vi} Also of note, Group 3 parents responded to the messages at extremely high rates—89% replied to at least one message, compared to 8% and 12% of Groups 1 and 2, respectively. These parent responses enabled administrators to engage with parents during the process and provided insights about the key challenges that families face during verification.

This study contributes to the field in several ways. First, it highlights that when seeking out ECE programs for their child, parents need help not just with *identifying* options but also with completing the multi-step process necessary to enroll. Several school choice experiments have shown that providing school profiles can affect which schools parents prefer (Corcoran, Jennings, Cohodes, & Sattin-Bajaj, 2018; Glazerman, Nichols-Barrer, Valant, & Burnett, 2018; Hastings & Weinstein, 2008). Fewer studies have tested the effects of helping parents through the process. Second, this study's results demonstrate the potential for a specific intervention to

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address a known barrier in the ECE enrollment process—and at low cost, with enrollment system administrators managing the intervention. Third, the text message exchanges between parents and administrators reveal barriers that keep parents from verifying eligibility and highlight the usefulness of two-way text messages for collecting real-time information about parents’ experiences and challenges.

Prior Literature

High-quality early childhood opportunities can improve a child’s short- and long-term outcomes (e.g., Phillips et al., 2017), yet quality is highly variable among ECE programs (Morris et al., 2017; Yoshikawa et al., 2013). Prior research has explored which children attend lower versus higher quality care (i.e., Bassok & Galdo, 2016; Valentino, 2017). Studies have also examined factors that drive families ECE choices and identified supply and cost as major drivers (e.g., Chaudry et al., 2011; Sandstrom, Giesen, & Chaudry, 2012), with some indications of informational or logistical barriers for disadvantaged families (Shapiro, Martin, Weiland & Unterman, 2019). However, few studies have examined the multi-step process that many parents must navigate to access public ECE programs. First, parents *search for programs* that meet their needs. Second, they *submit an application* to express interest in these programs. Third, they *verify their eligibility* by providing required documentation. Finally, they *register* to confirm enrollment. The specifics of these steps—search, apply, verify, register—vary across contexts but are common enough to define a basic enrollment “gauntlet” (especially for low-income parents in urban areas).^{vii} In describing the prior literature, we consider each of these steps but focus especially on eligibility verification.

Search

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Surveys indicate that, when searching for schools, parents seek “high-quality” programs (Barbarin et al., 2006; Bassok et al., 2018; Cryer & Burchinal, 1997; Forry, Tout, Rothenberg, Sandstrom, & Vesely, 2013; Meyers & Jordan, 2006). However, factors such as hours, location, and cost can affect decision-making (Barbarin et al., 2006; Kim & Fram, 2009; Rose & Elicker, 2008; Sandstrom & Chaudry, 2012; Sandstrom et al., 2012). Many parents consider very few options before enrolling (Bassok et al., 2018), but the reasons why are not precisely understood. One possibility is a lack of available options that meet families’ financial or logistical needs (Fetterman, 2018; Malik & Hamm, 2017; Sandstrom et al., 2018). Another possibility, not exclusive of the first, is that families struggle to navigate the options that do exist. For example, parents might not know about the programs for which they are eligible (Dechausay & Anzelone, 2016), or they might struggle to find time to conduct a thorough search process. In practice, most parents report relying on informal recommendations to find ECE programs (Bassok et al., 2018; Iruka & Carver, 2006; Pungello & Kurtz-Costes, 1999).

Apply

Searching for programs is just the first in a multi-step process, but little research in ECE has examined the steps that follow. Much of the research on subsequent steps comes from K-12 or higher education, raising questions about its applicability to ECE.

Historically, families applied directly to each ECE program. This mirrors historical charter school and college application processes. For charter schools, decentralized applications proved burdensome for families confronting mazes of requirements and deadlines (Gross, DeArmond, & Denice, 2015; Harris, Valant, & Gross, 2015). This paved the way for unified enrollment systems like OneApp that combine a common application—to apply to many schools with one form—with a placement algorithm. In higher education, colleges are participating in

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common applications in hopes of reducing the burden and redundancy of the process (Liu, Ehrenberg, & Mrdjenovic, 2007; Smith, 2013).

Some cities, including New Orleans, Chicago, Boston, and Washington, DC, have moved towards unified enrollment systems for ECE. A move toward common application or unified enrollment could simplify the ECE application process and encourage families to consider more options. In New Orleans, for example, the vast majority (86%) of 2017-18 ECE applicants requested more than one program, and a quarter of applicants request eight programs (the maximum allowed)^{viii}.

Verify Eligibility

This study focuses on the third step, eligibility verification. In ECE, verification often arises in the provision of publicly funded programs to families whose household income is below a state-defined income threshold. Parents must provide documentation to prove their eligibility for these programs. Families eligible for multiple programs may need to go through multiple, similar-but-different verification processes. For example, the annual household income threshold for Head Start in Louisiana is \$24,600 for a four-person household, while the threshold for Louisiana's Child Care Assistance Program (CCAP) is \$37,944. Head Start also requires an in-person interview not required by other programs. Differences in eligibility requirements across programs can frustrate efforts to streamline verification.

There are at least three reasons why parents might not complete verification. First, they might be *unaware* they need to verify. Parents juggle many obligations and might simply forget, or never notice, they need to verify. Second, parents might know they need to verify but *not understand* the exact process needed to do so. Third, parents might have *capacity limitations* that prevent them from verifying. This could take the form of structural barriers such as inflexible

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work schedules, lack of transportation options, or difficulty in accessing required documents.

Text messages will not eliminate long work hours or transportation challenges. A more promising strategy to addressing these type of challenges may be to simplify the process itself to make it less demanding (e.g. by eliminating the in-person visit) (Greenberg, Adams, & Michie, 2016). In fact, eliminating structural barriers can help to make the process more understandable as well. However, two-way messaging could create lines of communication between parents and administrators that help administrators understand and address the obstacles that parents confront (whether through individualized problem-solving or changes to broader policies and practices).^{ix}

Research on verification barriers in publicly funded ECE programs is lacking, but studies from two other areas are informative. First, cost is a major barrier in higher education, and many would-be recipients of financial aid do not complete the Free Application for Federal Student Aid (FAFSA). This delays or prevents them from receiving award packages (Wiederspan, 2019). Bettinger, Long, Oreopoulos, and Sanbonmatsu (2012) found that helping parents with the FAFSA as they received tax preparation assistance increased FAFSA submission, college enrollment, college persistence, and aid receipt rates. Meanwhile, research on families' use of child care subsidies shows that some barriers are practical or structural, such as a lack of adequate transportation (Herbst, 2008; Herbst & Tekin, 2012), while others are behavioral, such as not being informed about the process or avoiding it due to stigmas associated with subsidy receipt (Adams, Snyder, & Sandfort, 2002; Dechausay & Anzelone, 2016; Herbst, 2008; A. K. Mayer, Cullinan, Calmeyer, & Patterson, 2015).

Understanding why parents do not verify is important, as different reasons imply different solutions. Institutions can address structural barriers by, for example, enabling parents to verify near their homes or places of work (Greenberg, Adams, & Michie, 2016). However, if

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the barriers that prevent verification are behavioral rather than structural, this approach can only accomplish so much. Parents might benefit from interventions that target behavioral barriers.

Register

The final step in the process is registration. That is, after families have identified a program, applied, verified eligibility, and received a placement, they must submit enrollment paperwork. New Orleans programs require an in-person visit, again with specific documents (for residency and immunization). This final step has not been studied carefully in the ECE context, but it has captured the attention of higher education researchers. Castleman and Page (2014) show that many low-income high school graduates do not enroll in college even after completing steps along the way. Experimental evidence suggests that approaches such as college counseling (Castleman, Arnold, & Wartman, 2012) and personalized text messages (Castleman & Page, 2015) may help to reduce this “summer melt.”

Text Message Interventions

Studies using text messages have demonstrated potential, at a relatively low cost, for changing behaviors such as whether low-income students enroll in college (Castleman & Page, 2015), whether people vote (Dale & Strauss, 2009), and how parents engage with their young children (Doss et al., 2018; S. E. Mayer et al., 2018; York et al., 2018). Text-message outreach can provide direct, salient, and timely communications to parents, and open channels for two-way communication.

The optimal content, features, and tone of text messages remains an open question, though existing research provides some insight. Research suggests that overly formal or complex language can cause frustration (Oppenheimer, 2006), while personalized, accessible messages tend to yield desired outcomes (e.g., Haynes et al., 2013; Head, Noar, Iannarino, & Harrington,

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2013). Doss et al. (2018) found that relative to generic information, differentiated and personalized information increases the likelihood of parents reading to their children and improves children's literacy skills. Other studies, also focused on supporting young children's early literacy skills, show that parents do act on text messages (York et al., 2018), though sending many messages can be counterproductive (Cortes, Fricke, Loeb, & Song, 2018). However, findings from these studies, which focus on changing parents' day-to-day interactions with children, may not generalize to the current study context since verification asks parents to complete a narrowly defined administrative task at a particular time.

Policy Context

In 2012, Louisiana passed the Early Childhood Education Act (Act 3), which overhauled Louisiana's ECE system and required every local community to develop a coordinated approach to ECE program enrollment. New Orleans responded to Act 3 in part by leveraging its existing K-12 unified enrollment system, OneApp, to improve the ECE enrollment process. OneApp enables parents to apply to multiple schools at once, removing the need to navigate many application documents, requirements, and deadlines. It also provides a mechanism for placing students in schools based on families' rankings, school priority groups, and seat availability.

New Orleans expanded OneApp, which already included public school pre-K programs, to include other publicly funded ECE programs—Head Start, Early Head Start, and state-funded preschool programs in private schools and childcare centers.^x The Early Childhood OneApp requires the additional step of eligibility verification.^{xi} After submitting an application (and before the application deadline), applicants must come, in person, with documents that verify their eligibility for their requested programs (see Figure 1 for documentation requirements).^{xii} All applicants must show the child's birth certificate and proof of Orleans Parish residency. Because

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all Head Start and almost all state pre-K programs are targeted to low-income families, the vast majority of applicants also must show proof of their household income.^{xiii}

Making the process more complex, Head Start and Early Head Start required additional documents and an in-person interview and required that applicants verify at a Head Start Eligibility Center. Head Start centers' verification hours and days of operation varied across centers (see Figure 2). In contrast, school-based pre-K applicants could complete their verification at one of three Family Resource Centers (FRCs) during standard weekday hours.^{xiv} The district also held five Saturday verification events during the application period, at different locations around the city, at which parents could complete all aspects of the verification process. If parents failed to produce a complete set of documents at their visit, they had to return with all required documents.

In sum, while having a unified enrollment system may have simplified some aspects of ECE enrollment, the in-person verification step posed a practical barrier for enrollment. To examine these barriers, we conducted this RCT to address the following questions:

1. Can text messages increase families' ECE verification and enrollment rates?
2. Are formal and personalized texts equally effective?
3. Are the effects similar for pre-K and Head Start applicants?
4. What barriers do families identify in text messages with district staff?

Method

Data and Sample

Because New Orleans separates application and verification into distinct steps, we could identify, in real time, the parents who had enough interest in a public ECE placement to have submitted an application but had not yet completed verification. Through our collaboration with

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the district, we obtained data about ECE applicants. Since parents entered their phone numbers while completing the application, we had access to applicants' cell phone numbers to use for text messages. We also obtained data on whether parents ultimately completed the verification process, along with anonymized transcripts of the text message conversations between parents and district staff.

A total of 4,111 parents (or other guardians) submitted applications for 4,740 children in the 2018-19 Early Childhood OneApp. This intervention included the subset of those parents who applied for a seat within the first four weeks of the application period (November 1 through November 27, 2017) and had not completed the verification step by the end of that period. This consists of 1,224 parents who submitted applications on behalf of 1,407 children. Of the 2018-19 applicants not in the sample, 416 verified eligibility before the intervention started and the rest applied too late to be included in this analysis.^{xv}

Demographic data on participants are limited, but in the application pre-screening questions, applicants reported a (median) monthly income of \$1,200. This is below the poverty line for any family with a household size of two or greater. About 90% of parents in the sample were identified as living under 185% of the poverty line based on their answers to the pre-screening questions. About half of the children in our sample are male, and almost all applicants listed English as their preferred language. The intervention was provided only in English. The groups were well balanced, with no significant differences on any reported demographics or program types (see Table 1). About 63% applied for a Head Start or Early Head Start seat, which is restricted to families at or under 100% of the poverty line (and is the only OneApp option for children under three years old). Just over 40% applied for a four-year-old seat.

Intervention

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Applicants to the 2018-19 Early Childhood OneApp could apply between November 1, 2017, and February 23, 2018. Unverified applicants were randomly assigned to intervention groups on Monday, November 27. We randomized at the parent level so that a parent with more than one child in the study would receive the same type of communications for each child. Group 1 (n=414 parents/472 children), the control group, received the district's typical communications: formal, weekly email reminders to verify their eligibility, text-message alerts for up to five weekend verification events, and one "robo-call" reminder. Group 2 (n=400 parents/463 children) received the same communications plus weekly text messages (up to 15 total if a parent remained unverified for the entire period), also formal in tone (e.g., "Your child's OneApp is incomplete until you verify eligibility. Please review the following link for help finishing your OneApp."). Group 3 (n=410 parents/472 children) received the same communications as Group 2, but with a different tone in the text messages. Their messages were personalized, casual in tone, and encouraged two-way communication with a named member of district staff (e.g., "Hi, it's Ashley... I want to make sure [Child] doesn't lose her spot for next year! Text me if you'd like help finishing the OneApp!"). Group 3 members additionally received follow-up friendly texts after a verification event announcement, for a total of 19 possible texts. Online Appendices A1 through A3 show the messages sent to each group. Online Appendix A4 shows the weekly email reminder sent to all unverified applicants. The language of and schedule for these messages was developed by the research and district teams in collaboration. After obtaining relevant information (event dates, web links) from district staff, the research team wrote the first draft of all messages and then revised them based on staff feedback.

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The district sent reminder texts to Groups 2 and 3 on Tuesday mornings. In addition, they sent formal event announcement texts to all three groups on the Thursday before the Saturday event, with “Ashley” sending follow-up texts to Group 3 on those Fridays. Parents in all groups could respond to any text they received, though only parents in Group 3 were explicitly encouraged to reply. If parents replied to a text, a district staff member replied and attempted to help. Parents continued to receive weekly texts through the application period until they completed verification.

Analysis of Intervention Effects

To identify the effects of the intervention, we used a logit model to predict four outcomes as a function of intervention group membership (see Equation 1)^{xvi}. This analysis was conducted at the child level, with standard errors clustered by parent (13% of parents applied for seats for more than one child). All participants who received a group assignment were included in the analysis, even if they opted out of text messages. Outcomes were: (1) whether the parent sent the district a text message; (2) whether the child was verified by the deadline; (3) whether the child was enrolled in a public ECE program one year later (February 2019^{xvii}); and (4) the number of days until the applicant completed verification.

$$\eta_i = \alpha + \beta_1(\text{group}_{2i}) + \beta_2(\text{group}_{3i}) + e_i \quad (1)$$

$$\eta_i = \alpha + \beta_1(\text{group}_{2i}) + \beta_2(\text{group}_{3i}) + \beta_j(\text{controls}_i) + e_i \quad (2)$$

Here η_i represents the log-odds of the outcome for child i as a function of intervention group, with the control group as the reference group and each experimental group represented by a dummy variable. We also test the effects of the intervention while controlling for all available information about applicants (Equations 2 and 4): child’s gender, child’s age, language other than English, parent’s self-reported household income, and whether the applicant listed only

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gifted and tuition programs, which do not have income limits. Because we only know the grade level to which the child applied, and not their birthdate, age is measured in years. Additionally, because the verification process in New Orleans is more complicated for Head Start applicants – and because this could be a particularly disadvantaged population—we tested the specific benefit of the intervention for Head Start applicants by interacting treatment status with an indicator of having applied for a Head Start program (Equation 3).

$$\eta_i = \alpha + \beta_1(\text{group}_{2i}) + \beta_2(\text{group}_{3i}) + \beta_3(\text{HS}_i) + \beta_4(\text{group}_{2i} * \text{HS}_i) + \beta_5(\text{group}_{3i} * \text{HS}_i) + e_i \quad (3)$$

$$\eta_i = \alpha + \beta_1(\text{group}_{2i}) + \beta_2(\text{group}_{3i}) + \beta_3(\text{HS}_i) + \beta_4(\text{group}_{2i} * \text{HS}_i) + \beta_5(\text{group}_{3i} * \text{HS}_i) + \beta_j(\text{controls}_i) + e_i \quad (4)$$

We present both logit coefficients and marginal probabilities in the results tables. For ease of interpretation, we discuss effects in terms of the difference in marginal probabilities in the models without controls. We also use post-hoc Wald tests to test the equivalence of the group 2 and 3 parameters for all outcomes in all models; those results are reported in the text and in table notes.

Finally, we examine the speed with which applicants verified. While verifying earlier does not improve an applicant's chance of admission, it allows more time for parents and administrators to address problems with parents' verification materials and mitigates administrators' workload just before the deadline. Because time outcomes are not normally distributed and thus not well-suited to OLS regression, we used a Cox proportional hazards regression (Bradburn, Clark, Love, & Altman, 2003; Singer & Willett, 2003) to estimate the effect of group membership on the hazard function—in this case, the instantaneous rate of verification over the application period (Equation 5).

$$\log H(t_{ij}) = \log H_0(t_j) + \beta_1(\text{group}_{2i}) + \beta_2(\text{group}_{3i}) \quad (5)$$

Here, $\log H(t_{ij})$ represents the predicted cumulative hazard function for child i , and $\log H_0(t_j)$ represents the baseline hazard function for the control group. β_1 and β_2 represent the effects of intervention group membership on the hazard function. We present results from the model using as the outcome the number of business days between the start of the intervention and the date of verification. This metric creates a smoother and more accurate representation of the hazard function, as it removes long stretches (e.g., winter break) when offices were closed and applicants were unable to verify. However, regression coefficients are identical in the model estimated using calendar instead of business days, as the measures are perfectly correlated.

Text Content Analysis

We conducted a content analysis of text message conversations between district staff and applicants in order to identify barriers to verification by tabulating the frequency of a variety of parent text messages. Parent text categories were developed using an inductive coding process in which two coders examined a subset of the text content (~20%) to identify patterns and themes in the data. Once these themes were developed, coders conducted a second round of more focused coding of all text messages included in the sample. We measured inter-rater reliability on the 20% of data coded by both coders using Cohen's kappa (Hallgren, 2012); inter-rater reliability statistics ranged from 0.83 to 0.98.

Ultimately, we tabulated text content across three broad themes relating to a parent's likelihood of verifying—awareness, understanding, and capacity. *Awareness* captures a parent's recognition that additional steps are required to complete the enrollment process; i.e., knowing that verification is a required step. *Understanding* refers to the parent's knowledge of how to complete the verification step(s) – the parent both knows that verification is required, and the

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specific details of where to go, when, and what to bring. *Capacity* refers to the ability to navigate the related logistics, including finding required documents and traveling to a verification site during open hours. Additionally, we used chi-square tests to compare understanding and capacity messages between Head Start and Pre-K and between verified and unverified applicants. Because of small cell sizes, we used Fisher's exact test to compare awareness frequencies. Finally, we used themes developed in the frequency analysis, and memos generated throughout the coding process, to examine barriers pertaining to the Head Start process specifically. The quantitative analyses identified this subset of applicants as the group least likely to complete the verification process, and the tabulations revealed that over 10% of Head Start applicants were confused about aspects of the process specific to Head Start.

Results

Effects on Parental Text Messages to District Staff

The effects of the intervention, reported in log odds, appear in Table 2, with marginal probabilities appearing in Table 3. Note that the analysis of text messages is at the parent level, and thus the number of observations is lower for these models. As indicated in the first three columns, Group 3 participants, who received personalized texts that encouraged responses, sent texts at a much higher rate—89% sent at least one message, compared to 8% of Group 1 and 12% of Group 2. The Group 3 send rates were significantly higher than Group 1 and 2 rates, with no difference in effects between pre-K and Head Start subgroups.

Effects on Verification Rates

Applicants assigned to either the formal (Group 2) or personalized (Group 3) text-message intervention group were seven percentage points more likely to verify their eligibility by the end of the period, compared to the control group (67.2% and 66.9%, respectively,

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compared to 59.5%; see Tables 2 and 3). Verification rates did not differ between Groups 2 and 3 (Wald $\chi^2=.01$, $p>.5$). Texts were less effective in increasing verification rates for applicants who applied to at least one Head Start than for applicants who did not. Pre-K applicants were 15 percentage points more likely to verify than the control group when they received personalized texts (82.4% vs. 67.9%), compared to a non-significant five percentage-point difference (58.6% vs. 54.0%) for Head Start applicants. Group 2's formal texts produced a similar pattern of results.

The intervention also increased the speed with which applicants verified. Parents in Groups 2 and 3 had lower median verification times than parents in Group 1 and were about 25% more likely to complete verification at any given moment during the intervention (see Tables 4 and 5, and Figure 3).

Effects on Program Enrollment

Next, we turn to whether children were enrolled in a program as of the following February. Note that applicants who did not verify during the application period could still be enrolled in the following year, if they participated in the district's late enrollment process in the summer, completed verification at that time, and were able to find an open seat. Our analysis of effects on verification examine verifications completed during the application period (the target behavior), but analysis of enrollment includes all children who were enrolled the following year, regardless of their verification timing. Effects on having both verified *and* enrolled were similar to the effects on enrollment reported below, but with larger magnitudes.

Examining all applicants together, we find a marginally significant effect of personalized texts (Group 3) on enrollment ($p<.10$). However, we do not find a significant difference between Group 2 and Group 3's enrollment rates (Wald $\chi^2=.25$, $p>.5$). The effect of the personalized texts

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on enrollment appears to be driven by pre-K applicants, who were 10 percentage points more likely to be enrolled (17 percentage points more likely to have both verified *and* enrolled) if they received personalized texts (compared to the control group). Again, though, the Group 2 and 3 coefficients were not significantly different from each other (Wald $\chi^2=.94$, $p>.2$), and the program-type interaction term was also not statistically significant, leaving some uncertainty as to whether the effect of the texts on enrollment did in fact differ between personalized and formal text groups and between pre-K and Head Start applicants. The combination of results provides suggestive evidence that the intervention was substantially more effective for parents not applying to Head Start.

Text Content Analysis

Of the 1,224 parent applicants assigned to one of the three intervention groups, 1,214 received at least one text message. In all, 15,732 text messages were exchanged: 9,624 (61%) of those were automated texts sent to applicants, 2,738 (18%) were parent text responses, and 3,370 (21%) were district staff responses to parents' replies. The analysis below includes the text content of all applicants assigned to Group 3 (N=408) who received at least one text message.^{xviii} In other words, each number in Table 6 reflects the proportion of text-receiving Group 3 participants who responded (at least once) in the way described. Though at least some parents in all groups sent text messages to the district, we only coded texts from Group 3 parents, since the small subsets of Group 1 and 2 parents who replied, without invitation, to automated texts may not represent their broader groups.

Overall, the text message communications seem to have been well received by parents. Fewer than 2% of parents in the intervention groups opted out of the text messaging service, and

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parents voiced their appreciation in many of the text conversations. “I did it [verified] thanks so much for [t]he reminders,” wrote one applicant.

The text conversations provided the district with insight into the struggles parents face throughout this process—insight that the district used both to help individual issues parents faces and to refine the verification process in future enrollment cycles.

Is there a lack of *awareness* of the verification process? Text conversations indicated that parents were generally aware of the verification process. Fewer than 2% of parents indicated a complete lack of awareness that they needed to verify their child’s application; those applicants were more likely to be pre-K, not Head Start, applicants (see Table 6). Another 5% of parents indicated that they were aware of the process and did not pose additional questions for district staff. Of course, the text messages themselves might have made parents aware of the need to verify, so we cannot identify with certainty how many parents would have been unaware of the verification requirement in the absence of the texts.

Do parents have difficulty *understanding* how to verify their children? The vast majority (81%) of parents asked for help with the process, indicating an awareness of the process but a desire for guidance. In our analysis of the text messages, the most frequently mentioned barrier to verification was a lack of understanding of the steps required to verify, with no significant differences between pre-K and Head Start parents, or between parents who ultimately verified and those who did not, in the frequency of these responses. Just over half (51%) of parents asked specific questions like, “Can I bring the documents to any one of the Head starts even though I didn’t select them [as] a school?” Specific questions related primarily to verification locations (18% of parents), the documentation required to complete the process (17%), dates or times for verification (12%), and related deadlines (10%). Approximately 9%

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thought they had completed the process but realized through conversations with district staff that they had missed steps. In many of these cases, it was a misunderstanding about the specific verification requirements for Head Start seats—an issue we revisit in more detail below.

Do parents indicate a limited *capacity* to complete the verification process? Finally, 20% of parents indicated some logistical barrier to completing the process, again, with no significant differences between pre-K and Head Start parents', or verified and unverified parents, responses. About 15% expressed difficulty finding or accessing at least one of the required documents (most often residency or income documents). About 9% expressed that schedule conflicts prevented them from verifying during the available hours (most often because of conflicting work schedules). In one instance, a parent appeared overwhelmed by the process, communicating to district staff, "I see a lot of stuff is required and it's too much personal information for me to come up with." In most instances, however, parents stated specific concerns such as, "I almost have all the paper work ready to go submit [but couldn't] get into my food stamp account," to which district staff members could provide alternative solutions. For example, parents citing work hours conflicting with verification center hours were encouraged to attend a Saturday verification event. Although the capacity to complete verification was an obstacle in some circumstances, it was clear from the text content that the most frequent obstacle, at least among those who responded to the text messages, was understanding the administrative steps required to complete the process.

Analysis of Head Start Applicants' Texts

The subset of applicants applying for Head Start seats verified at lower rates. A further examination of the text conversations between this group of applicants and district staff highlights areas of misunderstanding that may be contributing to lower verification rates. Two

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clear difficulties unique to Head Start applicants presented themselves in this analysis. First, parents did not always understand the requirement to verify for a Head Start program every year. Parents whose child had been enrolled in a Head Start seat in previous years may have recently gone through the verification process, particularly if they enrolled after the start of the school year. These parents were aware that the verification step was required, but some did not realize they had to complete it again for the new program year.

District Staff Member: Remember to verify your docs before February 23rd.

Parent: How, I thought I did so, but I may be wrong

District Staff Member: You did it back in October for the 2 yr old program. Round 1 started November 1st. That previous verification does not count for the new program.

A second and more prevalent point of confusion for Head Start parents was a general misunderstanding that the process of verifying for a Head Start seat was different from the process of verifying for a school-based pre-K seat. Parents who apply for a Head Start seat can verify their child at a Head Start center for both Head Start and pre-K seats. However, an FRC cannot verify a child for their Head Start seat because of the Head-Start-specific interview requirement. Many applicants did not distinguish between the FRCs and the Head Start centers. This caused confusion for parents who had verified at an FRC and thought the process was complete but continued to receive texts from the district indicating incomplete verification status. Some exchanges between parents and administrators indicated that parents had to make extra trips to complete the verification process.

District Automated Text: Your OneApp is not complete until you submit these documents.. Hope to see you at the verification event!

Parent: I submitted all my documents so why am I gett this

District Staff Member: Hi, [parent's name], we do not have your OneApps marked as complete. Did you visit a Head Start Center to complete verification?

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Parent: Yes I did I complete everything
*Completed

District Staff Member: Thank you! Which Head Start did you verify with? We can follow up.

Parent: What do you mean

District Staff Member: You said you verified at a Head Start. Do you remember which one you brought your documents to? They would also have asked you some questions about your family.

Parent: I went to the family resource center on Dwyer

District Staff Member: Thanks! That's why you're marked incomplete. Since you're applying for Head Start, you need to visit a Head Start Center & they'll finish the process for you.

A lack of clarity around the distinction between verification processes for Head Start and other program seats could be consequential. The added confusion over verification locations may result in a failure to verify for some families.

Unpacking Differences in Effects for Head Start and Pre-K Applicants

District leaders expressed surprise that the intervention had such modest effects for Head Start applicants—and that verification rates remained so low for this group. There are a number of possible reasons for the differences in RCT results between Head Start and pre-K applicants. For instance, Head Start serves families with income below 100% of the federal poverty line, which means that they are likely more disadvantaged, on average, than New Orleans pre-K applicants (who are primarily applying for seats available to those under 200% of the poverty line). Perhaps text messages in general, or the specific content or style of this study's messages, are not well aligned with the needs of a population in such poverty. To explore this possibility, we analyzed the intervention effects for the subset of pre-K applicants whose self-reported

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income was below the 90th percentile for our HS applicants and found very similar effects for them as for the full group of pre-K applicants. Although there could still be important unobserved differences between the two populations, results from this specification check (available upon request) suggest that differences in income levels between these applicant groups are not the key explanation for the differences in results.

Head Start applicants also had younger children on average, as Head Start is the only option in the OneApp for children ages zero to two, and parents of children closer to school age may be more motivated to enroll in an ECE program (many of which provide guaranteed admissions to their affiliated elementary school). When examining effects for four-year-old Head Start applicants, however, we find that effects are again non-significant and similar in size to those of younger Head Start applicants, and also less than half the size of the effects for four-year-old pre-K applicants.

Another possibility is that the differences in outcomes are driven not by differences in the two populations, but by the fact that the Head Start verification process was more complex than the pre-K process—with additional document and interview requirements—and the text messages might not have been enough to cut through that complexity. Our district partners were optimistic that they could address some of the problems revealed in the text-message exchanges. To do so, the district combined information on *how* and *where* to verify into one document, where they had previously been two, to limit the amount of navigation required to find relevant information. Second, they reformatted the document to more clearly direct Head Start applicants to Head Start Eligibility Centers to complete their interview. In the original version (Figure 2), the “Where to Verify” page begins with a list of the FRCs. In the new version (Online Appendix A5), Head Start Eligibility Centers are listed first, with instructions that these applicants should

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verify at one of these locations. Upon making these changes, our partners encouraged us to test a similar intervention for that year's Head Start applicants^{xix}.

Seeing an opportunity to assess whether misunderstandings about the process had contributed to the smaller effects for Head Start applicants, we tested a similar—but more targeted and modest—intervention during the 2019-20 Early Childhood OneApp. This intervention was similar in that it tested the same three conditions, with similar messages, dissemination processes, and analyses. It was different, however, in several key ways. The follow-up study only included Head Start applicants. It started in January, involved a maximum of eight messages per recipient, did not include follow-up messages from Ashley about verification events, and targeted event texts to families who lived near the event location. Online Appendices A6 and A7 show the text and dates of the messages sent to Groups 2 and 3, respectively. (Group 1 messages consisted solely of event texts, which were recipient-specific.)

Results for this follow-up intervention, parallel in structure to the results presented for the initial intervention, appear in Online Appendices A8 through A10. In all, 1,760 parents received messages for 2,082 children, with applicants well balanced across groups. The key result for this intervention is that the Group 2 (formal) and Group 3 (personalized) messages produced large increases in verification rates. The Group 1 verification rate was 48.6%. The rates for Groups 2 and 3 (58.2% and 57.1%, respectively) were each significantly higher. Note that the samples did differ between the two years, in that the first intervention included only early applicants who applied within the first four weeks, where this second intervention included all unverified applicants who applied throughout the period. In theory, the intervention could simply be more effective for later applicants who have less time to complete verification and perhaps less familiarity with the system. However, we see no evidence that these differences in timing made

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any difference in the intervention's effectiveness. In the follow-up study, the texts were similarly effective for early applicants (63.7 and 61.7% verified for Groups 2 and 3, respectively, versus 53.2% for Group 1) as they were for later applicants (52.3 and 52.5%, versus 43.9%). These results lend additional support to the hypothesis that confusing materials dampened the initial intervention's effects for Head Start applicants.

Discussion

Over the last two decades, federal and state initiatives have increased low-income children's access to early childhood education. These initiatives are backed by research showing the importance of an enriched environment in the first few years of life for successful cognitive and emotional development (Shonkoff & Phillips, 2000) and the potential for high-quality ECE to improve achievement and life outcomes for low-income children (Heckman, 2006; Yoshikawa et al., 2013). Efforts to improve ECE access have included increasing the number of subsidized childcare seats (US DHHS, 2014), increasing Head Start and Early Head Start enrollment (US DHHS, 2015), expanding state pre-K programs (Barnett et al., 2016), and reducing administrative barriers to enrolling in childcare subsidy programs (Adams, Snyder, & Banghart, 2008).

One topic that has not received sufficient attention from researchers is the complex application and enrollment processes that parents—especially low-income parents—must navigate in order to get their children into a program. These processes may be challenging for many parents. In New Orleans, for example, about 35 percent of the low-income parents who applied for a publicly funded early childhood seat in 2016-17 did not complete the eligibility verification process. As a result, these parents lost their opportunity to obtain a seat that, by applying, they had demonstrated a desire to get.

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This paper describes the typical steps of the early childhood enrollment process for low-income parents—search, apply, verify eligibility, and register—to illustrate the various points at which the process can get derailed. We focus particularly on the eligibility verification step. A growing body of early childhood literature describes how families, and particularly low-income families, find early childhood programs for their children (the “search” step). Relatedly, there are now a number of experimental studies testing strategies for informing parents about the individual schools available to them (e.g., (; Corcoran, Jennings, Cohodes, & Sattin-Bajaj, 2018; Hastings & Weinstein, 2008). However, hardly any research has tested interventions to help parents through other, more logistical parts of the process.

We find that a simple, inexpensive intervention can substantially improve the rate at which low-income parents complete the verification step, particularly for applicants to pre-K. Overall, parents who received additional text messages about verifying their eligibility, regardless of tone or personalization, were about seven percentage points more likely to complete the verification process than parents in a control group. Further, when treatment group parents did verify, they did so more quickly. This is the first evidence we are aware of showing the potential of text messaging interventions to support parents through the ECE enrollment process. Notably, the control group in the current study received a fair number of communications itself, including text message reminders for weekend verification events. The treatment effects in the current paper may therefore provide a lower bound for the utility of these types of supports in contexts where no text messages are currently used.

This is encouraging, especially given that the financial cost of the text messaging was modest. The text messaging service we used charged \$0.824 per recipient per month. Applicants in Groups 2 and 3 began receiving text messages in November and continued to receive them

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through February or until they completed verification. For the applicants in this study, the cost of the text messages was approximately \$3,000. Based on the marginal probabilities of verification reported in Table 3, we estimate that an additional 74 children (45 pre-K applicants and 29 Head Start applicants) verified as a result of the intervention. The cost of the text messaging service per additional verified applicant was about \$40 (\$66 per Head Start parent; \$25 per pre-K parent). We also found that personalized texts increased the likelihood of enrollment for pre-K applicants. We estimate a text messaging cost of \$31 per additional enrolled student.

Of course, all of these costs are specific to the design of this intervention, the text messaging service used, and the estimated participation rates. The costs, while relatively low, do not account for the staff time needed to respond to parent texts, particularly for parents in the personalized group. The district reported that on the days when it sent messages, staff spent a substantial number of hours responding to texts. The burden on staff time is a consideration for the district in future communication planning.

Two additional findings from the study, which were unanticipated, warrant further discussion: (1) differences in outcomes between Head Start applicants and other applicants; and (2) differences in enrollment but not verification outcomes between the formal and personalized intervention groups.

First, our results show that parents applying only to pre-K (not Head Start) programs were 13 to 15 percentage points more likely to verify, from a baseline rate of 68%. Put differently, over 40% of pre-K applicants who would not have verified did so as a result of receiving text-message reminders. However, the effects were more modest for Head Start applicants. Our results suggest these unexpected differences were not driven by differences in the two populations, at least with respect to income levels. Rather, findings from our analysis of the

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text messages sent by Head Start applicants suggested that they struggled to understand the Head Start verification process, which was different and more complex than the process for pre-K process. In response, our district partners worked to clarify misunderstandings and make the Head Start verification process clearer. We conducted a follow-up RCT to assess whether the texting intervention was more effective with Head Start applicants after these changes and did find that the messages led to substantial increases in verification rates, though the effects were still smaller than those for pre-K applicants. This finding suggests that the benefits of the texting strategies explored here may differ depending on the clarity and simplicity of the underlying verification process.

The second unexpected finding relates to the effect of more personalized text messages. We expected that providing parents with personalized texts would amplify the effectiveness of the intervention. Evidence from other contexts suggests that when text messages are more personalized, tailored, and accessible, the recipients of those messages are more likely to act on them (e.g., Haynes et al., 2013; Head, Noar, Iannarino, & Harrington, 2013). Our findings on this question were not straightforward. We found similar effects on verification for Groups 2 and 3, suggesting that a simple, impersonal reminder (and link to instructions for how to verify) might be sufficient to induce action. However, only the personalized texts for Group 3 produced significant increases in enrollment rates one year after the intervention. We can only speculate as to why. One possibility is that friendly, personal communications are unnecessary for a logistical step like verification but instill attitudes or beliefs toward the district—such as connectedness, fondness, and a sense that the district wants to help—that makes parents want to enroll and stay enrolled. This would be an intriguing topic for future research.

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An important lesson from this work is that two-way texts provided a useful, real-time glimpse into the needs of low-income parents during the ECE enrollment process. Researchers and administrators often try to understand families' behaviors, beliefs, or barriers through surveys. However, field surveys tend to suffer from low response rates and concerns about social desirability bias. Responses to text messages provide an intriguing way to better understand the needs of families applying to public ECE programs. Nearly 90% of applicants who received personalized texts responded at least once, and the majority of applicants asked specific questions that revealed the challenges they were encountering. The high response rate suggests that a lack of motivation is an unlikely explanation for failures to complete verification. Rather, the primary barriers appear to be misunderstandings and capacity issues. Half of applicants asked questions related to understanding the process (which indicates that a communication intervention can solve the problem for many applicants), while nearly a fifth of applicants reported logistical barriers like document access and transportation (which would require interventions beyond text-message support). Over the course of this study, we saw the potential for program administrators to learn about and address challenges that emerge through text-message exchanges. As one example, district leaders revised Head Start informational materials in direct response to the problems that surfaced through the two-way messaging.

In this study we tested a particular type of intervention (text messages), in a particular context (the New Orleans ECE enrollment system), with a particular population (low-income parents). The study's results might not generalize to settings different from this one. However, we are aware of at least 15 districts, many of them in large cities, that use a centralized enrollment process for school-based pre-K programs, and a few that use a centralized process for programs for children under age three. Given evidence that application barriers exist at least in

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Boston (Shapiro et al., 2019), as well as in New Orleans, many of these districts might benefit from implementing a similar support program for applicants.

Notably, too, we tested just one type of approach—helping parents through a barrier in the ECE enrollment process. An alternate approach would be to remove the barrier altogether. For example, policymakers could align ECE income eligibility requirements with requirements for other social services, and then preapprove ECE applicants who qualify for these services. Policymakers also could attempt to create additional ways through a barrier, such as allowing parents to submit paperwork online or, as a neighboring Louisiana parish does, send photographs of their documents. Simplifying the verification process for Head Start applicants could be particularly beneficial, as many of today’s most disadvantaged parents—who might benefit most from high-quality care—confront the most complex and burdensome enrollment processes.

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TABLE 1. *Descriptive Statistics and Randomization Balance*

Applicant Characteristic	Descriptives			Balance	
	Group 1 (control)	Group 2 (formal)	Group 3 (personalized)	Group 2 – Group 1	Group 3 – Group 1
Male	0.505	0.514	0.510	0.009 (0.034)	0.004 (0.033)
English-speaking	0.989	0.981	0.979	-0.009 (0.009)	-0.011 (0.010)
Median monthly income (\$)	1,200	1,200	1,100	0.000 (71.880)	-100.000 (69.521)
Age of child					
Infant	0.028	0.032	0.032	0.005 (0.011)	0.004 (0.011)
One	0.123	0.130	0.129	0.007 (0.021)	0.006 (0.021)
Two	0.136	0.140	0.155	0.005 (0.023)	0.019 (0.023)
Three	0.273	0.287	0.278	0.014 (0.029)	0.004 (0.028)
Four	0.441	0.410	0.407	-0.030 (0.033)	-0.034 (0.033)
Program type					
Head Start	0.604	0.624	0.650	0.020 (0.034)	0.047 (0.034)
Pre-K	0.396	0.376	0.350	-0.020 (0.034)	-0.047 (0.034)
Observations					
Number of children	472	463	472		
Number of adults	414	400	410		

Note. Standard errors appear in parentheses. All values reported as proportions (of children) unless otherwise noted. “Program type” shows the proportions that applied for at least one Head Start seat or only Pre-K seats. Randomization balance statistics reflect results of OLS regression tests (conducted at the child level with standard errors clustered by adult applicant), except for median monthly income tests that used quantile regression. In addition, we conducted chi-squared tests of balance for age and program type and found no significant differences at the .10 level. Ten applicants (four in group 2; three each in groups 1 and 3) did not report gender.

+ $p < .10$. * $p < .05$. ** $p < .01$.

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Table 2. *Effects of Intervention*

Variable	Sent at least one message				Verified eligibility				Enrolled			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Group 2	0.342 (0.236)	0.347 (0.236)	0.345 (0.379)	0.348 (0.379)	0.330* (0.151)	0.357* (0.158)	0.665** (0.257)	0.733** (0.267)	0.114 (0.137)	0.211 (0.160)	0.151 (0.223)	0.294 (0.248)
Group 3	4.501** (0.238)	4.553** (0.241)	4.785** (0.395)	4.812** (0.397)	0.320* (0.149)	0.371* (0.156)	0.796** (0.259)	0.829** (0.268)	0.199 (0.135)	0.292+ (0.159)	0.460* (0.230)	0.564* (0.272)
Head Start			0.135 (0.360)	0.135 (0.364)		-1.442** (0.180)	-0.588** (0.208)	-1.086** (0.240)		-0.259 (0.188)	-0.484* (0.196)	-0.104 (0.256)
Group 2 x HS			-0.013 (0.485)	-0.008 (0.485)			-0.456 (0.320)	-0.553+ (0.328)			-0.040 (0.286)	-0.126 (0.320)
Group 3 x HS			-0.453 (0.496)	-0.416 (0.498)			-0.609+ (0.319)	-0.653* (0.328)			-0.343 (0.286)	-0.388 (0.334)
Monthly Income		0.002 (0.012)		0.002 (0.013)		-0.029* (0.011)		-0.030* (0.012)		-0.017 (0.012)		-0.017 (0.012)
English preferred		1.788* (0.698)		1.758* (0.699)		-1.026+ (0.619)		-1.061+ (0.620)		0.364 (0.380)		0.346 (0.378)
Gifted/tuition only						-0.728** (0.253)		-0.737** (0.259)		-2.201** (0.250)		-2.216** (0.250)
Child age (years)						-0.105+ (0.061)		-0.106+ (0.061)		0.786** (0.084)		0.784** (0.084)
Male						0.133 (0.119)		0.123 (0.119)		-0.108 (0.124)		-0.116 (0.124)
Constant	-2.382** (0.177)	-4.164** (0.719)	-2.461** (0.278)	-4.213** (0.752)	0.386** (0.103)	2.706** (0.693)	0.750** (0.159)	2.518** (0.692)	0.196* (0.096)	-2.008** (0.516)	0.491** (0.151)	-2.082** (0.518)
Observations	1224	1224	1224	1224	1407	1397	1407	1397	1407	1397	1407	1397

Note. Standard errors appear in parentheses and are clustered by adult applicants for the child-level outcomes (verified eligibility and enrolled). “Sent at least one message” is reported at the adult level. Group 1 (control) is the reference group. All estimates reported in log odds. Wald tests were used to compare the Group 2 and 3 coefficients, which were significantly different in the models predicting messages (i.e for Model 1, Wald $\chi^2=342.96$, $p<.001$) but not those predicting verification or enrollment.
+ $p<.10$. * $p<.05$. ** $p<.01$

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Table 3. *Marginal Probabilities of Applicant Behaviors by Program Type*

Group	Sent at least one message			Verified eligibility			Enrolled		
	All	Pre-K	Head Start	All	Pre-K	Head Start	All	Pre-K	Head Start
Group 1	0.085 (0.014)	0.079 (0.020)	0.089 (0.019)	0.595 (0.025)	0.679 (0.035)	0.540 (0.034)	0.549 (0.024)	0.620 (0.036)	0.502 (0.032)
Group 2	0.115 (0.016)	0.108 (0.025)	0.120 (0.021)	0.672 (0.024)	0.805 (0.032)	0.592 (0.033)	0.577 (0.024)	0.655 (0.037)	0.529 (0.031)
Group 3	0.893 (0.015)	0.911 (0.023)	0.881 (0.020)	0.669 (0.024)	0.824 (0.030)	0.586 (0.032)	0.597 (0.023)	0.721 (0.035)	0.531 (0.029)
All groups	0.365 (0.014)	0.353 (0.022)	0.373 (0.018)	0.645 (0.014)	0.766 (0.019)	0.573 (0.019)	0.574 (0.014)	0.663 (0.021)	0.521 (0.018)
Observations	1,224	493	731	1,407	526	881	1,407	526	881

Note. Table shows proportions of the total number of participants in the given group. Standard errors appear in parentheses. “Sent at least one message” is reported at the adult level; other outcomes are reported at the child level. “Pre-K” refers to those whose application did not include any Head Start programs. For ease of interpretation, marginal probabilities were calculated from models without covariates.

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TABLE 4. *Median Business Days Until Verification*

Group	Median (days)	Standard deviation (days)
Group 1	54	21
Group 2	44	22
Group 3	43	23
Head Start		
Group 1	58	20
Group 2	54	20
Group 3	54	22
Pre-K		
Group 1	38	22
Group 2	20.5	22
Group 3	21	22

Note. Medians calculated including participants who never verified, such that the median reflects the point at which 50% of the entire sample in a given group had completed verification.

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TABLE 5. *Hazard Ratios for Intervention Effects on Verification Timing*

Group	(1)	(2)
Group 2	1.249*	1.513**
	(0.111)	(0.198)
Group 3	1.277**	1.651**
	(0.113)	(0.213)
Head Start		0.639**
		(0.080)
Group 2 x Head Start		0.759
		(0.135)
Group 3 x Head Start		0.708+
		(0.125)
Observations	1,407	1,407

Note. Standard errors appear in parentheses. Group 1 (control) is the reference group. Hazard ratios calculated using Cox regression.

+ $p < .10$. * $p < .05$. ** $p < .01$.

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TABLE 6. *Content of Group 3 Text Messages (in Proportions)*

Response Category	Full sample	Head Start applicant		Ultimately verified	
		Yes	No	Yes	No
Lacked <i>awareness</i> that verification was required	0.012	0.004	0.026 ⁺	0.011	0.014
Had difficulty <i>understanding</i> how to verify	0.507	0.538	0.458	0.479	0.559
Unsure of verification locations	0.179	0.202	0.142	0.177	0.182
Unsure of documents required	0.167	0.170	0.161	0.143	0.210
Unsure of verification times/dates	0.120	0.142	0.084	0.125	0.112
Unsure of deadline	0.100	0.087	0.123	0.106	0.091
Incorrectly believed he/she had completed verification	0.088	0.107	0.058	0.102	0.063
Confused about Head Start verification process	0.086	0.119	0.032	0.075	0.105
Indicated limited <i>capacity</i> to complete verification process	0.203	0.202	0.206	0.211	0.189
Difficulty obtaining required document(s)	0.145	0.162	0.116	0.151	0.133
Obtaining proof of income	0.071	0.079	0.058	0.091	0.035
Obtaining proof of residency	0.056	0.063	0.045	0.053	0.063
Obtaining child's birth certificate	0.027	0.040	0.006	0.019	0.042
Difficulty getting to verification location during open hours	0.086	0.079	0.097	0.087	0.084
Due to work schedule	0.054	0.047	0.065	0.057	0.049
Due to transportation issues	0.020	0.020	0.019	0.019	0.021
Other					
Did not send a message	0.103	0.111	0.090	0.117	0.077
Opted out of text reminders	0.012	0.012	0.013	0.008	0.021
Observations	408	253	155	265	143

Note. Table shows the percentage of Group 3 participants that sent at least one message of this type. Chi-square tests were used to compare the overall frequency of awareness, capacity, and understanding responses (but not sub-categories) between Head Start and Pre-K and between verified and unverified applicants. Because of small cell sizes, Fisher's exact test was used to compare awareness frequencies.

⁺ $p < .10$. * $p < .05$. ** $p < .01$.

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FIGURE 1. Documents Required for Verification

Documents required for verification

In order to prove eligibility to receive a free early childhood seat, families must submit documents to any EnrollNOLA Family Resource Center or the Eligibility Centers listed on the next page. **If you do not verify your eligibility, you will NOT receive a placement.** Applicants must verify their eligibility within 5 business days of submitting their OneApp. Below is the list of documents required for Early Childhood programs:

	Required for Head Start and Early Head Start	Required for PK 4: LA4, NSECD, PEG
Birth certificate	✓	✓
Parent or Guardian ID	✓	✓
Proof of Guardianship (if not parent) ex: Foster Care	✓	✓
Two Proofs of Residency*		
Current rental lease agreement	✓	✓
Homestead Exemption in the parent's name	✓	✓
Electricity/gas bill	✓	✓
Sewerage/water bill	✓	✓
Telephone bill	✓	✓
Cable/internet service bill	✓	✓
Section 8 or HANO Voucher Statement	✓	✓
Current official letter from a government agency	✓	✓
Proof of Household Income	Bring all that apply	Bring all that apply
Working Applicants must provide one of the following:		
4 Current and Consecutive Pay stubs for each parent or caregiver in the house** (must be within 2 months of date completing verification)	✓	✓
W-2 forms	✓	not required
Income Tax form (1040, 1040 EZ, 1040 A, 1099)	✓	not required
An official letter from your employer stating: - Where parent/guardian is employed and start date - Hourly rate of pay & frequency of pay (weekly, biweekly, monthly) - The average number of hours parent/guardian works per week.	✓	✓
Non-working applicants must provide one of the following:		
Most recent unemployment compensation statement	✓	✓
If unemployed and not receiving unemployment compensation: Parent/caregiver must submit a letter of support and income documentation from support source.	✓	not required

* Either the parent/guardian name must be on the residency documents or if the parent/guardian lives with another adult who is named on the residency documents, the parent/guardian must bring a signed letter from the person named on the residency documents stating that the parent/guardian lives at that same address. If bringing a letter, parent/guardian must bring acceptable proofs of residency in resident's name.

** Paychecks/stubs must be calculated on a 40 hour/week basis. If you work less than 40 hours each week, please bring a letter from your employer on letterhead stating where you are employed, your hourly rate of pay, frequency of pay, and the average hours worked a week in order to accurately calculate your actual income.

Note. Document obtained from EnrollNOLA website in November 2017. NSECD refers to the Non-Public Schools Early Childhood Development program; PEG refers to the Preschool Expansion Grant.

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FIGURE 2. Verification Locations and Times for 2018-19 Applications

Where to Verify

FAMILY RESOURCE CENTERS | ELIGIBILITY CENTERS

If you apply to PK4 or NSECD program, you must visit a Family Resource Center within 5 days to complete the verification process. Family Resource Centers are open Monday - Friday, 8:30 AM - 4 PM.

<p>Uptown Lawrence D. Crocker Elementary 2300 General Taylor Street, 70115</p>	<p>New Orleans East Livingston Collegiate Academy 7301 Dwyer Road, 70126</p>	<p>Westbank Orleans Parish School Board Central Office 3520 General DeGaulle Drive, Suite 1101, 70114</p>
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1-877-343-4773 | www.EnrollNOLA.org
No appointment necessary for FRC's or Eligibility Centers

If you apply to Head Start or Early Head Start programs, you must visit an Eligibility Center within 5 days to complete the verification process.

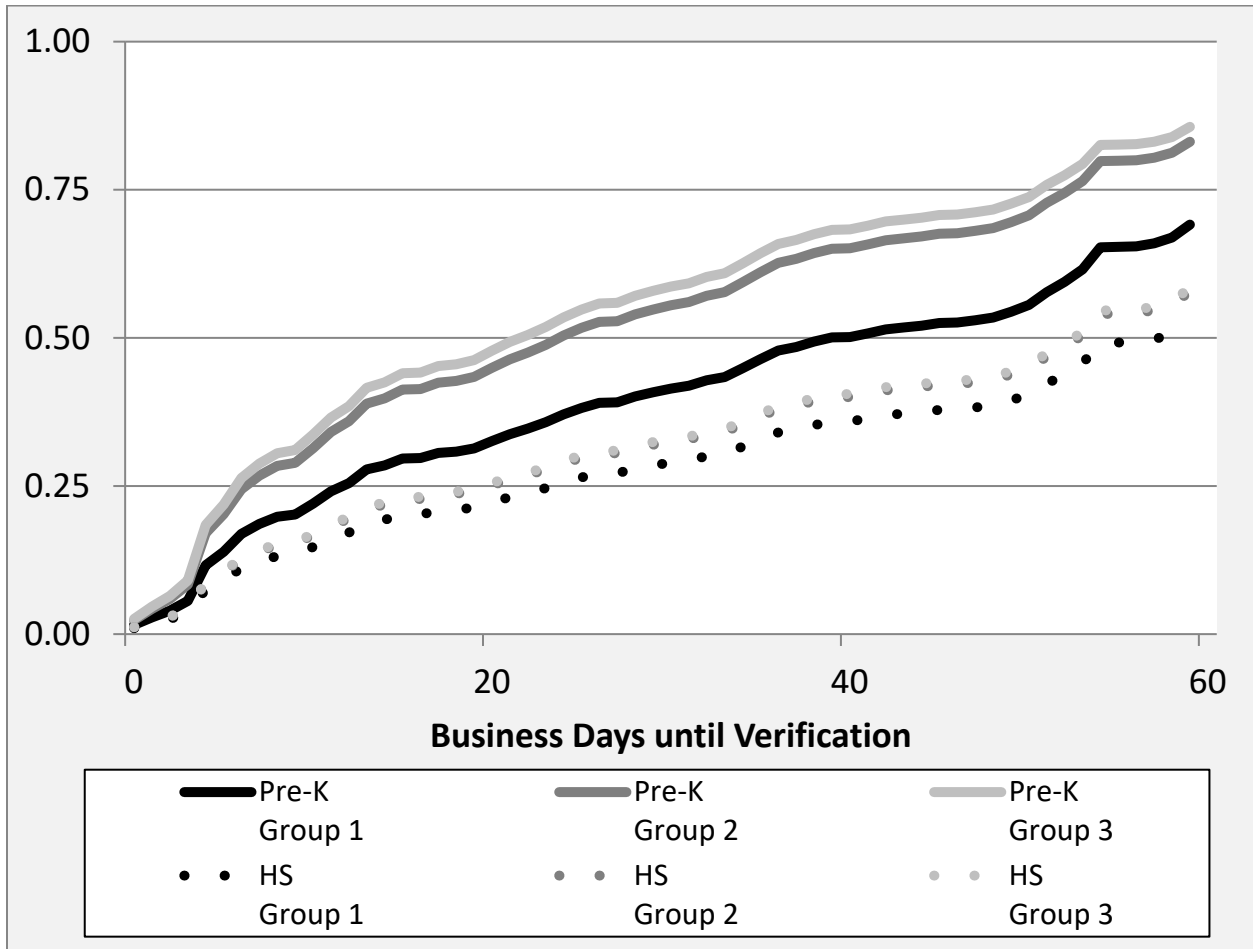
Below is a list of Eligibility Centers. See the attached page for a list of documents you should bring with you, or visit EnrollNOLA.org. You will get a call from EnrollNOLA if a seat becomes available. Please be sure that the contact information your provided is updated and accurate.

	HEAD START CENTER	HOURS	ADDRESS (New Orleans)	PHONE
Uptown	Central City E.O.C. Head Start Center	M-TH, 10 AM - 2 PM	2020 Jackson Ave., 70113	(504) 210-1143
	Carrollton-Dunbar Head Start Center	M, T, TH, 10 AM - 2 PM; W, 2 - 6 PM	9301 Colapissa St., 70118	(504) 325-5818 ext. 1560
	Kingsley House	M-F, 9 - 11 AM, 2 - 3 PM	1600 Constance St., 70130	(504) 523-6221
	Incarinate Word Head Start	M-TH, 10 AM - 2 PM	8326 Apricot St., 70118	(504) 861-6342
	Dr. Peter W. Dangerfield	M, T, TH, 10 AM - 2 PM; W, 2 - 6 PM	1402 S. Jefferson Davis Pkwy., 70125	(504) 459-4820
	Magic Street at Fabourg Lafitte H.S.	M - W, 10 AM - 2 PM; TH, 2 - 6 PM	2101 Lafitte St., 70122	(504) 577-2142
	Priscilla R. Edwards Head Start Center	M-TH, 10 AM - 2 PM	1962 Jackson Ave., 70113	(504) 210-1143
	TCA Head Start at Mahalia Jackson	M, T, TH, 10 AM - 2 PM; W, 2 - 6 PM	2405 Jackson Ave., 70113	(504) 359-6891
	St. John the Baptist Head Start	M-F, 8 AM - 3 PM	1920 Clio St., 70113	(504) 529-2557
	Viney Reynolds at Marrero Commons	M, W, TH, 10 AM - 2 PM; T, 2 PM - 6 PM	3501 Erato St., 70125	(504) 459-4848 ext. 1531
Downtown	Educare	M-F, 10 AM - 2 PM	3801 St. Bernard Ave., 70122	(504) 308-3400
	St. David Head Start Center	M, T, TH, 10 AM - 2 PM; W, 2 - 6 PM	1230 Caffin Ave., 70117	(504) 459-4845
	St. Mary of the Angels Head Start	M-F, 8 AM - 4 PM	2225 Congress Street, 70117	(504) 227-3470
	Urban League Head Start Center	M-TH, 10 AM - 2 PM	2800 Desire Pkwy., 70126	(504) 944-0801
N.O. East	Gentilly East Head Start Center	M, T, TH, 10 AM - 2 PM; W, 2 - 6 PM	4347 Reynes St., 70126	(504) 325-5827 ext. 1570
	James Singleton Head Start Center	M, W, TH, 10 AM - 2 PM; T, 2 - 6 PM	14441 Curran Boulevard, 70128	(504) 325-5839 ext. 1581
Westbank	Diana Head Start Center	M, W, TH, 10 AM - 2 PM; T, 2 - 6 PM	2144 Pace Blvd., 70114	(504) 325-5800 ext. 1541
	Pearlie H. Elloie Head Start Center	M, 2 - 6 PM; T, W, TH, 10 AM - 2 PM	3029 Wall Blvd., 70114	(504) 325-5807 ext. 1550
EARLY HEAD START ONLY				
	Boys Town LA Early Head Start	M-W 2 PM - 5 PM TH-F, 8 AM - 5 PM, <i>Appointment Only</i>	300 North Broad St. Suite 106, 70119	(504) 293-7900
	LSU Health Sciences Center EHS	M-F, <i>Appointment Only</i>	411 S. Prieur St., 70112	(504) 556-7585
	Total Community Action	M-TH, 9 AM - 12 PM - CLOSED JULY	1422 S. Jefferson Davis Pkwy., 70125	(504) 459-4813

Note. Schedule obtained from EnrollNOLA website in November 2017.

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FIGURE 3. *Business Days to Verification, by Head Start Status and Intervention Group*



Note. Because the failure outcome (verification) is the target intervention behavior, the graph depicts the failure function (the inverse of survival) for each group, separated by Head Start application status. Graph generated from the post-estimation results following the Cox regression.

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ⁱ Parents who failed to complete verification had the opportunity to complete verification during the late enrollment period and take any remaining open seat or add their child to waitlists. However, by that time, many high-demand programs, and nearly all seats for children under 4, were full.

ⁱⁱ At the time of this project, the office was housed within the state-run Recovery School District; they have since been incorporated into the Orleans Parish School Board central office. For simplicity, we refer to them as “the district.” In public-facing materials, the office is referred to as “EnrollNOLA.”

ⁱⁱⁱ All parents in Groups 1, 2, and 3 could respond to any text message they received from the district, but only Group 3 parents were explicitly invited to respond.

^{iv} The associated 95% confidence intervals are: Group 1—54.7-64.4%, Group 2—62.4-72.0%, and Group 3—62.3-71.6%.

^v The associated 95% confidence intervals are: Group 1—50.2-59.5%, Group 2—53.0-62.3%, and Group 3—55.2-64.2%.

^{vi} Aside from Head Start, all seats in this system are for three- and four-year-olds and almost all are in public or private schools. A small number are located in private childcare centers working in partnership with public schools. For simplicity, we refer to all non-Head Start seats as “pre-K.”

^{vii} See Klasik (2012) for an analogous description of the college enrollment gauntlet.

^{viii} Authors’ analysis of de-identified OneApp application data.

^{ix} This list of reasons why parents do not verify eligibility is not exhaustive. For example, while likely uncommon in New Orleans, undocumented immigrants might worry about producing (or failing to produce) documents for government review (e.g., Abrego, 2011).

^x Louisiana funds public pre-K seats in private settings through two funding streams: the Non-Public Schools Early Childhood Development program and the Preschool Expansion Grant. Applications for childcare center seats funded by federal subsidies are not yet included in the OneApp.

^{xi} From this point forward, we use “OneApp” to refer to the Early Childhood OneApp, which is the primary focus of this study.

^{xii} Note that although this document states that families must verify within five business days of submitting the application, the district allows families to verify until the Main Round deadline, regardless of application date.

^{xiii} A few charter schools in Orleans Parish are chartered by the state Board of Elementary and Secondary Education and thus accept students from any Louisiana district. Additionally, public schools with pre-K seats are allowed to offer tuition-based seats, which do not require income verification. Programs for gifted students also do not require income verification. In 2017-18, of 40 schools offering pre-K, approximately a dozen offered tuition-based or gifted seats (almost always in addition to seats for low-income students and those with special needs).

^{xiv} Families applying to both Head Start and school-based pre-K programs could complete verification for all school choices at the Head Start Eligibility Center, so it was not the case that they had to visit separate sites. However, these parents could *not* complete Head Start verification at a Family Resource Center.

^{xv} The intervention was originally intended to also include applicants who applied later and did not verify within a week. However, due to an error in the text-messaging system, these applicants did not receive the intervention as designed and could not be included in the analysis.

^{xvi} OLS models are often preferred, even with binary outcomes, for their more straightforward interpretation. However, when modeling effects separately by program (Equation 2 below), some results from OLS models differed slightly from results from logit models. All estimates were in the same direction, but the statistical significance of the interaction terms varied between OLS and logit models. Therefore, we present the logit model results, which are more appropriate for binary outcomes.

^{xvii} We do not have fall enrollment data for this cohort of children.

^{xviii} Of the 410 participants in Group 3, two participants had inactive phone numbers on file and never received the text communication. Our analysis includes only the 408 participants who successfully received a text from the district.

^{xix} Because the formal one-way texts were successful in raising pre-K applicants’ verification rates in the first intervention, the district set up automated one-way texts for those applicants for this follow-up year.