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Received: 26 April 2022 | Revised: 22 December 2022 | Accepted: 6 January 2023

DOI: 10.1111/cfs.13003

ORIGINAL ARTICLE

CHILD & FAMILY SOCIAL WORK WILEY

Fostering educational prosperity: A randomized controlled trial of home tutoring in foster care

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Funding information
Social- og Integrationsministeriet

Abstract

The educational gap between children in out-of-home care and their non-placed peers is well-documented. However, tutoring stands out as a promising intervention to raise children's educational attainment in out-of-home care. This study randomized 105 children in foster care (62% girls, aged 7–15 years [$M = 10.3$, $SD = 2.0$]) to the home tutoring program Foster Caregivers as Tutors (FCT) or regular public school services (treatment as usual [TAU]). In the FCT group, the foster caregivers tutored the children for 2.5 h/week for 40 weeks. The program effect is measured in learning and developmental outcomes, including reading and math ability, learning skills, IQ, executive function, and psychosocial function. Follow-up was 17.5 months after baseline. The results show a significant effect over time in both groups on IQ (effect size [ES] = 0.40, $P < 0.001$), verbal comprehension ($ES = 0.29$ $P = 0.02$) and perceptual reasoning ($ES = 0.60$, $P < 0.001$) measured by WISC IV. Neither the FCT nor TAU provided any significant academic recovery in reading and math nor progression in executive function, learning skills or psychosocial function. These findings, implications for practice and future efforts to support the schooling of children in out-of-home care are discussed.

KEYWORDS
child development, education, Foster care, intervention program, school performance, tutoring

1 | INTRODUCTION

Research consistently documents poor educational outcomes of children in out-of-home care (OHC), including lower academic performance, higher grade retention rates, more frequent referrals to special education and poorer educational attainment in adulthood compared to their peers (Berridge, 2012; Brady & Gilligan, 2019; Brännström et al., 2017; Evans, 2001; Gypen et al., 2017; Okpych & Courtney, 2014; Pecora et al., 2006; Scherr, 2007; Sinclair et al., 2019; Stone, 2007; Sullivan et al., 2010; Trout et al., 2008). Thus, closing the educational gap is becoming an increasingly important aim of the child protection system in many countries.

A growing number of studies document the impact of the foster home environment and the importance of the foster caregiver involvement in the scholastic success of children and youth in foster care (Cheung et al., 2012; Flynn et al., 2013; Pears et al., 2010). In particular, Cheung et al. (2012) demonstrated that though 85% of the variance in educational outcomes was attributed to individual factors, 15% of the variance was attributable to differences between placements. The results showed that foster homes characterized by high academic support and a strong literacy environment were more likely to foster children with better scholastic achievement. Other studies also point to the positive influence of high educational expectations by foster caregivers on academic performance (Eiberg & Olsen, 2022; Tessier et al., 2018). In a study by Tessier et al. (2018), high aspirations of the foster caregivers for how far the young person would progress in the educational system were associated with better educational performance. Moreover, Eiberg and Olsen (2022) demonstrated that

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foster mothers' judgement of their foster children's educational potential directly affected reading and math achievement and significantly mediated the association between individual characteristics such as age and IQ and performance in reading and math. Furthermore, numerous retrospective accounts from care leavers, who succeed in the educational system, have stressed the importance of educational support and encouragement by their foster caregivers (Mannay et al., 2015; Martin & Jackson, 2002; Neal, 2017). Still, only a limited number of school support programs seek to strengthen the engagement of foster caregivers as a resource in qualifying foster children and youth for educational achievement (Evans et al., 2017; Forsman & Vinnerljung, 2012).

A contemporary meta-analysis of educational interventions targeting children and youth in OHC identified only three separate studies of school support programs delivered by foster caregivers (Evans et al., 2017). Only one of these studies was of a school support intervention delivered in a regular foster care environment. This study evaluates the tutoring program 'Teach Your Children Well' (TYCW), in which foster caregivers, on the basis of a 1-day seminar, provide 3 h of tutoring for their foster child per week (Flynn et al., 2012; Marquis, 2013). The study found significant progress in several math and literacy outcomes (Flynn et al., 2012). Other high-quality studies have also found support for the benefits of tutoring for children and youth in OHC in other settings, for example delivered by college student volunteers and in a small-group-based format (Harper & Schmidt, 2012, 2016). Recently, a study of one-on-one home tutoring by professional tutors has also yielded positive results in some aspects of reading and math (Hickey & Flynn, 2019). Generally, tutoring has shown positive results in numerous settings and for diverse participants. A meta-analysis of tutoring of children in K-8 by volunteers (e.g. college students) showed an average *ES* of 0.3 for literacy, though the results for math were not significant (Ritter et al., 2009). Also, a recent meta-analysis of various tutoring programs for students pre-K–12 found similar effect sizes for literacy and math with an overall similar effect size of 0.37, although teacher and paraprofessional tutoring yielded larger effect sizes than parent tutoring (Nickow et al., 2020). However, another review of studies of parental tutoring of school-aged children, primarily elementary school students (K–6), found an overall *ES* of 0.55 for literacy and math (Erion, 2006). Moreover, studies of tutoring of elementary school students at risk of reading failure suggest that children with academic difficulties also can benefit from tutoring (Elbaum et al., 2000). With tutoring standing out as a beneficial and manageable intervention to support educational progress, more evidence is needed to establish its potential in a foster care setting.

1.1 | The present study

Foster caregivers are a resource in closing the educational gap between children in OHC and their peers, which could be better utilized through interventions such as tutoring. The present study evaluates the effectiveness of the Danish tutoring program 'Foster Caregivers as Tutors' (FCT) in a randomized controlled trial (RCT), comparing FCT to treatment as usual (TAU). FCT is a home-based tutoring intervention conducted by foster caregivers. Though tutoring stands out as a favourable interventional approach, the current evidence does not point to a particular preferable program or universal method (Erion, 2006; Nickow et al., 2020; Ritter et al., 2009). Hence, the FCT does not prescribe step-by-step tutor instructions, but rather FCT provides some general techniques and materials focused on different aspects of math and literacy development for the foster caregivers to choose from to individualize the tutoring to suit the child's specific needs, difficulties and strengths. Moreover, although the benefits of tutoring have been firmly documented regarding reading and math skills (Erion, 2006; Flynn et al., 2012; Harper & Schmidt, 2016; Hickey & Flynn, 2019; Nickow et al., 2020), its potential also to promote development in a broader sense by creating opportunities for participation in structured activities that focus not only on academic skill-building but also on aspects such as knowledge acquisition, language development and impulse control has not been strategically targeted nor evaluated. Studies of adoptees and early deprived children in long-term OHC have found a naturalistic effect of the improved care environment on developmental outcomes, such as IQ (Humphreys et al., 2022; van Ijzendoorn & Juffer, 2006). Providing foster caregivers with tools to support their foster children contribute to improving the quality of the foster care environment and may also enhance aspects of general development. Recent studies of tutoring of children in OHC have investigated potential spillover effects from the tutoring of tasks with strictly academic content on other aspects of development, for example executive function (EF) and mental health, which has not proven to be effective (Hickey & Flynn, 2019; Marquis, 2013). This study hypothesizes that the FCT intervention will a) improve school performance in reading and math and b) enhance aspects of general development through structured activities aimed at enhancing learning skills and behavioural adaptation (e.g. training of impulse control via tasks involving, e.g. stop–go and taking turns and following a sequence). The individualized content of the tutoring may target many different aspects of development, and therefore, we include several developmental outcomes for exploratory purposes, including measures of cognitive abilities (IQ), EF, acquisition of learning skills and psychosocial function.

This study is part of a larger three-armed RCT investigating two different approaches to school support for children in OHC (Eiberg & Scavenius, in press). The present paper focuses solely on the FCT program compared with TAU to elaborate on the intervention content, the implementation study and suitable research literature related to this approach.

2 | METHODS

2.1 | Inclusion and exclusion criteria for the study

The inclusion criteria for the study included placement in foster care and attendance in grades 1–7 in a regular school. The study excluded children for whom reunification was planned before enrollment and was to take place during the study, as well as children with pre-

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diagnosed pervasive developmental disorders (defined by code F84 in ICD-10) or intellectual disability (documented IQ < 70), as children with such diagnoses probably would benefit more from tutoring or other interventions aimed at children with these particular disabilities.

2.2 | The intervention: Foster caregivers as tutors

The FCT is a home-based, highly individualized tutoring and training program suitable for children in grades 1–9. The program consisted of a full-day, small-group seminar for foster caregivers taught by the program developers, all of whom had a background in education and special education. The seminar consisted of three modules on how to work with general skill-building and tutoring in the foster home. Included were a module in literacy (predominantly reading), a module in math and a module that focused on how to increase motivation, incite positive behaviour and tutor according to individual difficulties and strengths. The program included a comprehensive e-book with instructions for games, role plays, apps, print-out board games, traditional academic paper-pencil tasks and structured activities suited for grade levels 1–9 that targeted a range of different subjects at different skill levels. For the following 40 weeks, for at least 2.5 h/week, the foster caregivers were to work with the general tutoring techniques in homework tutoring and employ the e-book materials to cover knowledge gaps and basic training. The program developers were available for individual counselling by e-mail and weekly by phone throughout the intervention. At midterm, a noncompulsory brush-up, full-day seminar was delivered by the developers.

2.2.1 | Treatment as usual

In this study, the TAU condition comprises regular schooling practices in Denmark, excluding special education. Due to practical limitations, no records have been kept of different practices, but collectively, FCT and TAU represent a broad spectrum of Danish public school practice.

2.3 | Procedure

A flow diagram of the study is shown in Figure 1.

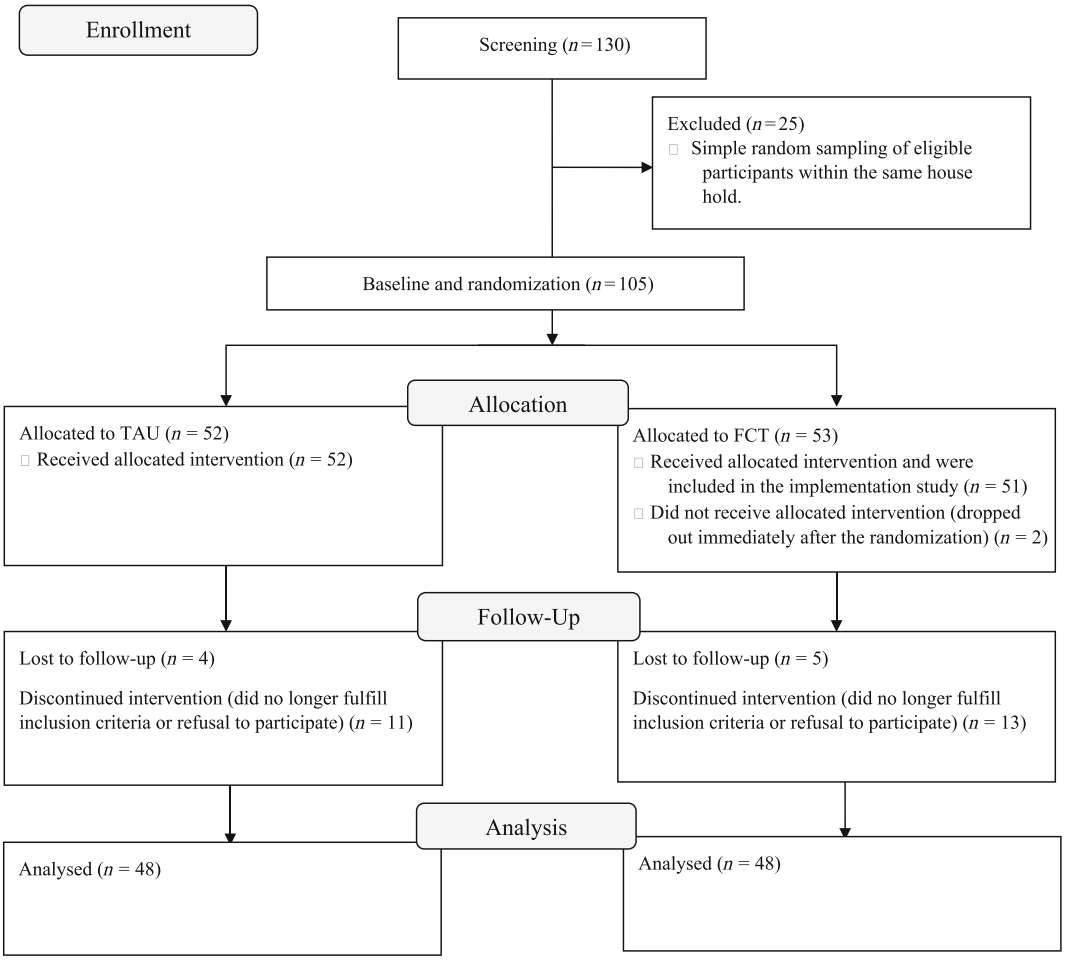


FIGURE 1 Flow diagram of the RCT study.

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2.3.1 | Random sampling

Only one eligible foster child in each of the enrolled foster families was initially selected to participate in the study through simple random sampling to avoid random sampling of family clusters. We anticipated that the risk of sampling school clusters would be low since Danish public schools generally have few eligible students for the study enrolled.

2.3.2 | Research design and randomization of participants

A baseline measurement was collected before randomization and again at follow-up. The research team allocated participants in the study by computerized random allocation to FCT or TAU immediately after the baseline assessment. The research team was blind to allocation, and allocation was done in an unstratified 1:1 ratio with a variable block design to mask the sequence of allocation.

2.4 | Assessment

The foster families were recruited by their local schools. A trained psychologist and teachers from the child's school conducted the baseline and follow-up testing. The study recruited participants throughout a full semester, after which the FCT seminar was held. Due to practical considerations of the collective trial, comprising not only the FCT but another intervention of approximately 18 months' duration with immediate onset, all children were post-tested 17.5 months ± 1 week after their baseline assessment regardless of group allocation. In that way, the workload for the limited number of psychologists administrating the pre- and post-testing was steady, and the assessment cycle was suitable for either experimental intervention. For the FCT intervention, that meant that the first child randomized to FCT waited approximately 6 months for the intervention to begin, and the last child randomized to FCT waited only a few weeks for the intervention. Concluding the intervention period, the first allocated child was then post-tested immediately after the intervention (17.5 months), and the last allocated child was post-tested approximately 6 months after the FCT ended (17.5 months). Data were collected in 2014 and 2016.[1] At the time of baseline assessment, the most recent version of selected instruments was chosen and applied for both assessments. All academic tests were developed for Danish students and based on Danish norm populations. All other instruments were administered in validated Danish translations, and—when possible—published Danish norm populations were applied.

2.5 | Primary outcomes

2.5.1 | Reading ability

Given the wide age span of the participants, reading ability was assessed on different ability levels with three standardized, norm-referenced tests, including the Word Reading Test (WRT; Møller & Juul, 2012a), the Sentence Reading Test (SRT; Møller & Juul, 2012b) and three subtests from the comprehensive Text Reading Tests battery (TRT; Nielsen et al., 1998). The WRT and the SRT were administered to all participants, and the three TRT subtests were administered only to participants in grades ≥5. As too few participants completed the TRT, the test is not included in the analyses presented here.

The WRT and the SRT generate a measure of 'reading accuracy' measured in the percentage of correctly answered items out of the total of items responded to and a measure of 'reading speed' measured as an average of seconds used per item. In the analysis, we use grade-level adjusted scores showing the average deviation from the norm score. No published Danish reading test holds norm data for all the included grade levels. Norms for the WRT and the SRT exist only for grades 1–5, and we estimated norms for the remaining grade levels (grades 6, 7 and 8) using a Tobit regression. To our knowledge, no reliability values are available for the WRT and SRT.

2.5.2 | Math skills

Math skills were assessed with the MG test, a standardized, norm-referenced comprehensive test of grade-level adjusted math ability covering the curriculum of K-10. The Cronbach's alphas range between 0.71 (grade level 4 version) to 0.94 (grade level 7 version), with two grade-level versions obtaining Cronbach's alphas under 0.80, namely grade level 1 and grade level 4. The MG test uses standardized C-scores with values ranging from 0 to 10. The manual describes scores of 0–2 as indicating serious disability in math and between 7 and 10 as indicating mastery of the curriculum (Hansen, 2007). Since the pre- and post-tests took place during the school year, all participants were tested with the version of MG suitable for a grade level below the child's actual grade.

2.6 | Secondary outcomes

2.6.1 | Intellectual ability (IQ)

The Wechsler Intelligence Scale for Children IV (WISC IV) was used to measure intellectual ability. WISC IV is a comprehensive, standardized and norm-referenced measure to estimate IQ. The test includes four indexes of specific cognitive abilities, including the Verbal Comprehension Index (VCI), the Perceptual Reasoning Index (PRI), the Working Memory Index (WMI) and the Processing Speed Index (PSI). Reliability coefficients range from 0.88 (PSI) to 0.97 (FSIQ). WISC IV uses standardized scores with a mean of 100 and an *SD* of 15. (Wechsler, 2003).

2.6.2 | Executive function

Two instruments were employed to measure EF. The Behavioural Rating Inventory of Executive Function (BRIEF) is a standardized,

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norm-referenced questionnaire with 86 items covering a range of behaviours related to EF (e.g. self-monitoring, goal-directed behaviour and impulse control). The BRIEF's main outcome is a full-scale score of the General Executive Composite (GEC). The reliability coefficients for the GEC are 0.97 (parent version) and 0.98 (teacher version). The BRIEF uses T-scores with a mean of 50 and an *SD* of 10 and has a clinical cut-off score of 1.5 *SD* above average (t-score of ≥65). (Gioia et al., 2000). The BRIEF was administered to foster mothers, foster fathers and teachers.

Also, the Contingency Naming Test (CNT) was administered to all children. CNT is a standardized, norm-referenced test that resembles the classic Stroop test but entails two shifting conditions (Anderson et al., 2000). The CNT requires visual attention, cognitive flexibility, impulse control and working memory, and its primary outcome is an efficiency score, which is a combined measure of time use and accuracy. We report individually for the trial entailing one shifting condition and the trial entailing two shifting conditions. To our knowledge, no reliability values are available for the CNT. The present study converts efficiency scores into z-scores to allow for cross-age and gender comparisons.

2.6.3 | Acquisition of learning skills

We used the domain 'Learning skills' (consisting of 29 items) from the comprehensive, norm-referenced questionnaire on general development, Five-to-Fifteen (FTF), to measure attitudes, strategies and behaviour displayed in formal and informal learning situations. The Cronbach's alphas for the domain 'Learning skills' are 0.96 and 0.97 for the parent and teacher versions, respectively. Items are scored 0–2, with higher scores indicating a higher degree of developmental and behavioural problems. The domain score is the average score of the items included in the domain (Kadesjö et al., 2004; Korkman et al., 2005; Lambek & Trillingsgaard, 2015). According to the FTF manual, this particular domain is suitable only for children aged 9 years and above. Therefore, the test was administered only to foster mothers, foster fathers and teachers of children aged 9 years and above.

2.6.4 | Psychosocial function

The Strengths and Difficulties Questionnaire (SDQ) was completed by foster mothers, foster fathers and teachers to measure the children's psychosocial function. SDQ is a standardized, norm-referenced questionnaire with 30 items in the extended version covering emotional symptoms, conduct problems, hyperactivity/inattention, peer relationship problems and prosocial behaviour. The SDQ also includes a total difficulties score consisting of 20 items, not including the scale of prosocial behaviour. The extended version includes an impact score of chronicity, distress, social impairment and burden to others. The reliability coefficients for the total difficulties score are 0.82 and 0.87 for parent and teacher ratings, respectively. The reliability coefficient for the impact score is 0.85 for both teacher and parent ratings. The SDQ items are answered on a scale of 0–2, and scale scores are the sum scores of relevant items, with higher scores indicating more problems (Goodman, 2001; Niclasen et al., 2012). Only the total difficulties score and impact score are reported.

Furthermore, all children filled out the norm-referenced questionnaire, This is Me (TM), which is a measure of self-perception and social function for school-aged children (grades 1–10). It consists of 32 items for grade levels 1–3 and 72 items for grade levels 4–10. The latter includes five subscales, but only the total score is reported. For the full scale, Cronbach's alpha was 0.86 for grades 1–3 and 0.91 for grades 4–10. TM uses standardized stanine scores of 1–9 with a mean of 5 and an *SD* of 2. The manual describes scores of 4–6 as the normal range (Ouvinen-Birgerstam & Hartmann, 2006).

2.7 | Implementation study

To monitor the implementation and compliance with the instructions of the FCT, all foster caregivers received a journal in a standardized format for weekly reports (four journals each covering 10 weeks of the program) of what and how they were using the e-book materials, their time use for the preparation of the tutoring, weekly duration of tutoring and obstacles to tutoring. With the last journal, the foster caregivers also received an evaluation survey containing questions about their overall experiences with the program.

2.8 | Statistical analyses

The statistical analysis applies intention-to-treat (ITT), controlling for non-independence of baseline and follow-up observations. In particular, we estimated the following fixed-effects (FE) regression:

$$Y_{it} = \alpha_i + \Delta Time_t + \delta\,(Time_t \times Treatment_{it}) + \varepsilon_{it},$$

where Y_{it} is the outcome (e.g. WRT, WISC or BRIEF scores) for child i at time t. $Time_t$ is an indicator variable equal to 0 for baseline outcomes and 1 for follow-up outcomes. Similarly, $Treatment_{it}$ is equal to 0 for the TAU group and 1 for the FCT group. The crux of FE regression is the $i = 1, \ldots, N$ intercepts, α_i, which model the dependence between baseline and follow-up observations from the same child. That is, the individual intercepts account for time-invariant predictors of the outcome (e.g. gender, history of maltreatment or other stable characteristics of child i, affecting both Y_{i0} and Y_{i1}). Because α_i accounts for all child-level variance, the errors, ε_{it}, are independent, and the FE-regression produces valid parameter estimates. See Wooldridge (2013) and StataCorp (2021) for an introduction to FE and McNeish and Kelley (2019) for a recent review of FE and similar estimation models for clustered data.

The analysis proceeds in two steps. We first calculate the unadjusted means and standard deviations by time × group. Second, we

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estimate within-group changes and between-group treatment effects using the FE regression with robust standard errors. In particular, the regression parameter Δ estimates the average change from baseline to follow-up within the TAU group, and Δ + δ estimates the average change from baseline to follow-up within the FCT group, so δ estimates the between-group treatment effect. For both Δ and δ, we report Cohen's d to determine the relative magnitude of each change, dividing the change by the baseline SD of the entire sample. Values around 0.2 suggest a relatively small effect, values around 0.5 suggest a medium effect, and values around 0.8 suggest a relatively large effect (Cohen, 1988).

3 | RESULTS

3.1 | Participants and allocation

One hundred and five children and their foster families participated in the study. Foster families from 23 municipalities (almost a quarter of all Danish municipalities), including both urban and rural areas, enrolled in the study, and collectively, the included children attended 78 different regular public schools.

Due to random sampling, only 105 out of 130 eligible foster children residing in the 105 participating foster families were enrolled in the study, baseline assessed and randomized to a treatment group. Fifty-three children were randomly allocated to the FCT group, and 52 children were allocated to the TAU condition.

3.1.1 | Foster children

The children (61.9% female) aged 6–15 years ($M = 10.3$, $SD = 2.0$) and were all living in foster care (88.6% were in non-relative foster care, 8.6% in kinship or network care and 2.9% in an intensive support foster care family). The children had been in their current placement for an average of 5.5 years ($SD = 3.2$, range 2 months to 14 years). No children were excluded based on the exclusion criteria of the study.

3.1.2 | Foster caregivers

Table 1 summarizes the foster caregiver and foster home characteristics in the treatment groups. Overall, the foster caregivers and foster homes have similar characteristics in the FCT group and the TAU group.

3.2 | Implementation of FCT

3.2.1 | Seminar attendance

Forty-five (88.2%) of the 51 foster families participated in the seminar, and in 69.9% of the families, both foster caregivers attended. For the six nonparticipating families, the developers mailed all the material and a short manual and provided some key instructions on how to use

TABLE 1 The foster caregiver and foster home characteristics in the treatment groups.

	Foster mothers				Foster fathers			
	TAU		FCT		TAU		FCT	
	n	%	*n*	%	*n*	%	*n*	%
Years of education	50	100	48	100	42	100	44	100
9–10	4	8.0	4	8.3	6	14.3	5	11.4
11–12	19	38.0	21	43.8	24	57.1	29	65.9
13–15	27	54.0	22	45.8	10	23.8	10	22.7
16–17	0	0	1	2.1	2	4.8	0	0
Employment	44	100	49	100	39	100	42	100
No other employment	28	63.6	35	71.4	13	33.3	14	33.3
Learning environment	50	100	53	100				
A foster parent reads to or with the foster child ≥ 5 days a week	19	38.5	22	41.5				
A foster parent reads to or with the foster child ≤ once a week	15	30	8	15.1				
A foster parent assists the child with homework or other school activities ≥ 5 days a week	15	30	14	30.2				
A foster parent assists the child with homework or other school activities ≤ once a week	12	24	7	13.2				
	n	*M* (*SD*)	*n*	*M* (*SD*)				
Household number of children	50	2.5(1.1)	53	2.1(1.0)				

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the materials by phone. For the midterm noncompulsory brush-up seminar, 27 (52.9%) of the 51 foster families participated.

3.2.2 | Implementation data

Throughout the intervention period, the number of journals submitted declined. In the initial 10 weeks, 38 (74.5%) out of a total of 51 participating foster families filled out the journal, but only 25 (49.0%) journals were submitted for the last 10 weeks of the study. Likewise, only 24 foster families filled out the evaluation questionnaire at week 40, corresponding to 47.1% of the 51 participating families.

3.2.3 | Implementation of tutoring

As registered by the families, the average weekly time spent on tutoring amounts to 2 h 8 m. Almost half (46.1%) of the families registered at least 2.5 h of tutoring a week. On average, the families spent 2 h 53 m on tutoring the first week, and after that, the average time use steadily decreased to an average of 1 h 38 m in week 40. Overall, the variation in the time spent tutoring is very large, ranging from some families spending no time tutoring in some weeks to families spending 10 h or more tutoring in some weeks.

The extent to which the foster families used the provided educational materials for the tutoring also declined during the intervention. In the first week, approximately one-third (32.4%) of the tutoring was primarily based on the e-book. Although the use of e-book materials was rather steady during the first 10 weeks, it thereafter gradually declined. In the last weeks of the program, none of the families registered any use of the e-books or supplementary materials and based all tutoring on homework assignments. Accordingly, the average time the foster caregivers registered for preparing the tutoring (e.g. choosing materials, reading instructions, printing materials and preparing demonstrations) dropped during the intervention, especially in the first few weeks. In the first week, the foster caregivers registered an average of 1 h 4 m of preparation time ranging from 0 to 6 h. Already in week 2, the average weekly preparation time dropped to 45 min, and in week 40, the average preparation time had dropped to 1 min.

In the evaluation survey, many families list the low motivation of the child (42.1%) and lack of time (26.3%) as the main barriers to tutoring. In comparison, only 5% list their personal motivation as a barrier, and 10% list difficulties in choosing and applying the educational materials as an obstacle.

3.3 | Attrition

Table 2 shows the treatment groups' percentage of dropouts and the reasons. During the study, the dropout rate was 22.9%. Reasons for dropout included changes in school enrollment or placement, reunification and refusal to participate. The dropout rate and the reasons given were reasonably similar in the FCT and TAU groups except for the rate of participants refusing participation, which was higher for the FCT group.

TABLE 2 Drop-out rate according to reasons given in the treatment groups.

	TAU ($n = 52$)		FCT ($n = 53$)	
	n	%	*n*	%
Private school	3	5.8	1	1.9
Special education	5	9.6	4	7.5
Reunification	0	0	1	1.9
Residential care	1	1.9	1	1.9
Refusal to participate	2	3.8	6	11.3
Total	11	21.1	13	24.5

3.4 | Baseline assessment

Table 3 shows a summary of participant characteristics (age and gender) and baseline scores for each treatment group in reading and math. Table 4 shows baseline scores for outcome measures of learning skills, cognition and psychosocial function in the FCT and the TAU group. Overall, the FCT group tends to have less favourable average scores on most outcomes compared to the TAU group. However, both groups have average scores below the norm score on all outcomes.

3.5 | Primary outcomes

Table 3 summarizes the key differences within and between the groups in reading and math. No significant progress in reading outcomes was found for the FCT group or the TAU group. Similarly, we found no significant effect on math achievement for either the FCT group or the TAU group.

3.6 | Secondary outcomes

Table 4 summarizes the groups' within and between differences in cognitive and psychosocial outcomes. Over time, both groups showed cognitive improvements on FSIQ, the VRI and the PSI (WISC IV) from baseline to follow-up. Children in the TAU group showed an average gain in the FSIQ score ($\Delta = 5.52$, $ES = 0.40$, $P < 0.001$), as well as a significant improvement in the cognitive domains of verbal comprehension, measured by the VCI ($\Delta = 4.00$, $ES = 0.29$, $P = 0.02$), and in perceptual reasoning, measured by the PSI ($\Delta = 8.78$, $ES = 0.60$, $P < 0.001$). No additional effect was found in the FCT group, compared to TAU ($P \geq 0.08$). Moreover, we found no other significant changes over time in any other outcome measures of executive function, acquisition of learning skills or psychosocial functioning for either group. Average scores on most outcome measures show only very marginal differences over time.

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TABLE 3 Unadjusted means and standard deviation and adjusted within (Δ and Δ + δ) and between (δ) group effect estimates (Cohen's d) for academic outcome measures.

	TAU				FCT			
	n	Baseline *M* (*SD*)	*n*	Follow-up *M* (*SD*)	*n*	Baseline *M* (*SD*)	*n*	Follow-up *M* (*SD*)
Age (years)	52	10.4 (2.2)			53	10.3 (1.9)		
Gender (% female)	52	63			53	60		
Reading accuracy in word reading (pct. correct)[a]	50	−5.91 (17.12)	44	−2.76 (9.95)	52	−14.61 (23.63)	43	−9.17 (18.22)
Reading accuracy in sentence reading (pct. correct)[a]	47	0.20 (12.78)	45	−2.38 (10.53)	52	−6.11 (17.63)	43	−4.77 (13.93)
Reading speed in word reading (s)[a]	50	0.03 (3.08)	44	0.35 (2.06)	52	1.55 (4.24)	43	1.18 (2.30)
Reading speed in sentence reading (s)[a]	45	5.56 (14.91)	45	1.77 (6.27)	52	8.21 (23.10)	43	2.99 (7.76)
Math achievement (MG, C-score)	50	4.40 (2.14)	47	4.74 (2.51)	53	4.55 (2.46)	48	4.46 (2.30)

Note: Adjusted estimates from the fixed-effects regression $Y_{it} = \alpha_i + \Delta Time_t + \delta\,(Time_t \times Treatment_{it}) + \varepsilon_{it}$, where Δ estimates average change from baseline to follow-up within the TAU group and Δ + δ estimates average change from baseline to follow-up within the FCT group, so δ estimates the between-group treatment effect. Estimates using Stata 17 software.
Abbreviations: CI, confidence interval; ES, effect size; M, mean; SD, standard deviation; TAU, treatment as usual.
[a]Deviation from the norm score adjusted for the grade level.

TABLE 3 (Continued)

	Adjusted estimates									
	Δ	95% CI	SE	*P*-value	ES	δ	95% CI	SE	*P*-value	ES
Age (years)										
Gender (% female)										
Reading accuracy in word reading (pct. correct)[a]	2.79	[−0.68; 6.26]	1.77	0.12	0.14	0.05	[−5.03;5.13]	2.59	0.99	0.002
Reading accuracy in sentence reading (pct. correct)[a]	−2.30	[−6.93; 2.32]	2.36	0.33	−0.16	4.26	[−2.13;10.63]	3.26	0.19	0.29
Reading speed in word reading (s)[a]	0.43	[−0.52; 1.38]	0.48	0.38	0.07	−0.63	[−2.04;0.78]	0.72	0.38	−0.10
Reading speed in sentence reading (s)[a]	−4.57	[−9.20; 0.06]	2.36	0.06	−0.26	1.51	[−5.91;8.93]	3.79	0.69	0.09
Math achievement (MG, C-score)	0.36	[−0.34; 1.05]	0.36	0.32	0.16	−0.48	[−1.40;0.44]	0.47	0.31	−0.27

Note: Adjusted estimates from the fixed-effects regression $Y_{it} = \alpha_i + \Delta Time_t + \delta\,(Time_t \times Treatment_{it}) + \varepsilon_{it}$, where Δ estimates average change from baseline to follow-up within the TAU group and Δ + δ estimates average change from baseline to follow-up within the FCT group, so δ estimates the between-group treatment effect. Estimates using Stata 17 software.
Abbreviations: CI, confidence interval; ES, effect size; M, mean; SD, standard deviation; TAU, treatment as usual.
[a]Deviation from the norm score adjusted for the grade level.

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TABLE 4 Unadjusted means and standard deviation and adjusted within (Δ and Δ + δ) and between (δ) group effect estimates (Cohen's d) for developmental outcome measures.

	TAU				FCT			
	n	Baseline *M* (*SD*)	*n*	Follow-up *M* (*SD*)	*n*	Baseline *M* (*SD*)	*n*	Follow-up *M* (*SD*)
Full-scale IQ (WISC IV, std. score)	50	90.10 (15.13)	48	97.02 (16.40)	53	86.55 (14.19)	48	90.47 (14.89)
Verbal Comprehension Index (WISC IV, std. score)	50	93.48 (15.33)	48	97.81 (18.97)	53	88.85 (13.08)	48	91.63 (17.51)
Perceptual Reasoning Index (WISC IV, std. score)	50	97.56 (16.65)	48	108.44 (18.10)	53	97.42 (14.49)	48	102.25 (13.02)
Working Memory Index (WISC IV, std. score)	50	86.74 (13.30)	48	89.83 (16.30)	53	83.40 (14.37)	48	83.57 (16.37)
Processing Speed Index (WISC IV, std. score)	50	91.72 (13.52)	48	94.04 (13.72)	53	88.64 (13.54)	48	91.94 (13.84)
Global Executive Composite: foster mothers (BRIEF, T-score)	50	65.34 (9.23)	44	64.34 (8.47)	52	67.87 (8.82)	43	66.42 (12.18)
Global Executive Composite: foster fathers (BRIEF, T-score)	42	64.95 (9.34)	43	64.53 (10.38)	43	65.21 (9.23)	37	65.65 (10.24)
Global Executive Composite: teachers (BRIEF, T-score)	52	67.75 (16.38)	47	68.13 (18.57)	51	71.04 (17.03)	47	74.06 (18.80)
Efficiency score: one shifting condition (CNT, z-score)	47	−0.52 (0.87)	45	−0.09 (1.35)	49	−0.95 (0.96)	47	−0.40 (0.92)
Efficiency score: two shifting conditions (CNT, z-score)	42	−0.34 (1.01)	44	0.05 (1.35)	41	−0.72 (0.81)	46	−0.18 (0.95)
Learning skills: foster mothers (Five-to-Fifteen, sum score)	34	0.89 (0.44)	43	0.84 (0.43)	40	1.09 (0.47)	40	1.02 (0.52)
Learning skills: foster fathers (Five-to-Fifteen, sum score)	29	0.84 (0.51)	41	0.93 (0.46)	33	1.04 (0.53)	35	1.07 (0.51)
Learning skills: teachers (Five-to-Fifteen, sum score)	36	0.79 (0.50)	46	0.79 (0.49)	41	0.89 (0.52)	44	0.96 (0.57)
Total difficulties score: foster mothers (SDQ, sum score)	50	14.64 (6.65)	46	13.61 (6.60)	53	16.11 (6.20)	42	14.26 (6.92)
Total difficulties score: foster fathers (SDQ, sum score)	42	13.69 (5.68)	43	13.40 (6.51)	44	15.45 (5.79)	37	15.32 (6.85)
Total difficulties score: teachers (SDQ, sum score)	52	10.77 (7.88)	48	10.71 (7.50)	53	12.72 (7.53)	48	11.50 (6.86)
Impact score: foster mothers (SDQ, sum score)	50	1.44 (1.75)	46	2.09 (1.94)	53	2.55 (2.25)	42	2.57 (2.44)
Impact score: foster fathers (SDQ, sum score)	41	1.59 (2.04)	43	1.84 (1.90)	44	1.89 (2.09)	37	2.00 (2.31)
Impact score: teachers (SDQ, sum score)	52	1.27 (1.59)	48	1.40 (1.54)	53	1.60 (1.70)	48	1.85 (1.90)
This is Me, full-scale (stanine score)	48	4.42 (1.94)	45	4.82 (2.11)	46	4.26 (2.19)	48	4.56 (2.23)

Note: Adjusted estimates from the Fixed-effects regression $Y_{it} = \alpha_i + \Delta Time_t + \delta\,(Time_t \times Treatment_{it}) + \varepsilon_{it}$, where Δ estimates average change from baseline to follow-up within the TAU group and Δ + δ estimates average change from baseline to follow-up within the FCT group, so δ estimates the between-groups treatment effect. Estimates using Stata 17 software.

Abbreviations: CI, confidence interval; ES, effect size; M, mean; SD, standard deviation; TAU, treatment as usual.

* p <.05; *** p <.001.

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TABLE 4 (Continued)

	Adjusted estimates									
	Δ	95% CI	SE	*P*-value	ES	δ	95% CI	SE	*P*-value	ES
Full-scale IQ (WISC IV, std. score)	5.52	[2.79; 8.26]	1.39	<0.001 ***	0.40	−1.27	[−4.78; 2.24]	1.79	0.48	−0.09
Verbal Comprehension Index (WISC IV, std. score)	4.00	[0.79; 7.21]	1.64	0.02*	0.29	−1.08	[−5.66; 3.49]	2.33	0.64	−0.08
Perceptual Reasoning Index (WISC IV, std. score)	8.78	[4.98; 12.58]	1.94	<0.001***	0.60	−4.05	[−8.52; 0.42]	2.28	0.08	−0.28
Working Memory Index (WISC IV, std. score)	2.44	[−0.45; 5.32]	1.47	0.10	0.19	−1.84	[−5.95; 2.28]	2.10	0.38	−0.14
Processing Speed Index (WISC IV, std. score)	0.89	[−2.63; 4.41]	1.80	0.62	0.07	2.32	[−2.43; 7.06]	2.42	0.34	0.17
Global Executive Composite: foster mothers (BRIEF, T-score)	−0.09	[−2.11; 1.93]	1.03	0.93	−0.01	−1.84	[−4.91; 1.23]	1.57	0.24	0.20
Global Executive Composite: foster fathers (BRIEF, T-score)	−0.49	[−3.10; 2.13]	1.33	0.72	−0.05	0.38	[−3.40; 4.15]	1.93	0.85	0.04
Global Executive Composite: teachers (BRIEF, T-score)	−0.15	[−4.87; 4.57]	2.41	0.95	−0.01	3.02	[−3.49; 9.53]	3.32	0.37	0.18
Efficiency score: one shifting condition (CNT, z-score)	0.45	[−0.04; 0.93]	0.25	0.07	0.47	0.21	[−0.37; 0.79]	0.30	0.48	0.22
Efficiency score: two shifting conditions (CNT, z-score)	0.40	[−0.01; 0.81]	0.21	0.06	0.42	0.22	[−0.28; 0.72]	0.26	0.40	0.23
Learning skills: foster mothers (Five-to-Fifteen, sum score)	−0.31	[−0.26; 0.01]	0.07	0.06	−0.30	0.06	[−0.11; 0.23]	0.06	0.45	0.14
Learning skills: foster fathers (Five-to-Fifteen, sum score)	−0.02	[−0.15; 0.12]	0.07	0.78	0.04	−0.02	[−0.17; 0.14]	0.08	0.81	−0.04
Learning skills: teachers (Five-to-Fifteen, sum score)	−0.05	[−0.22; 0.12]	0.09	0.54	−0.10	0.09	[−0.12; 0.30]	0.11	0.39	0.18
Total difficulties score: foster mothers (SDQ, sum score)	−0.61	[−2.27;1.06]	0.85	0.48	−0.09	−0.92	[−3.09; 1.26]	1.11	0.41	−0.14
Total difficulties score: foster fathers (SDQ, sum score)	−0.76	[−2.51;0.99]	0.89	0.39	−0.13	0.62	[−1.82; 3.07]	1.25	0.62	0.10
Total difficulties score: teachers (SDQ, sum score)	−0.40	[−2.02;1.23]	0.83	0.63	−0.05	−0.52	[−2.79; 1.74]	1.16	0.65	−0.07
Impact score: foster mothers (SDQ, sum score)	0.59	[−0.16; 1.33]	0.38	0.12	0.30	−0.47	[−1.61; 0.67]	0.58	0.42	−0.24
Impact score: foster fathers (SDQ, sum score)	0.19	[−0.68; 1.06]	0.44	0.67	0.09	0.17	[−0.89; 1.23]	0.54	0.75	0.08
Impact score: teachers (SDQ, sum score)	0.02	[−0.45; 0.49]	0.24	0.93	0.01	0.27	[−0.41; 0.95]	0.35	0.44	0.16
This is Me, full-scale (stanine score)	0.36	[−0.19; 0.91]	0.28	.20	0.18	0.07	[−0.68; 0.82]	0.38	0.85	0.04

Note: Adjusted estimates from the Fixed-effects regression $Y_{it} = \alpha_i + \Delta Time_t + \delta\,(Time_t \times Treatment_{it}) + \varepsilon_{it}$, where Δ estimates average change from baseline to follow-up within the TAU group and $\Delta + \delta$ estimates average change from baseline to follow-up within the FCT group, so δ estimates the between-groups treatment effect. Estimates using Stata 17 software.

Abbreviations: CI, confidence interval; ES, effect size; M, mean; SD, standard deviation; TAU, treatment as usual.

* p <.05; *** p <.001.

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4 | DISCUSSION AND CONCLUSIONS

One hundred and five children in grades 1–7 participated in an RCT comparing the FCT program with TAU. We found no effect of FCT in this study on performance in reading and math nor on other developmental outcomes, including IQ, EF, learning skills and psychosocial functioning, compared to TAU. The analysis suggests that TAU seems to stimulate some aspects of the children's cognitive development significantly over time, including IQ, verbal comprehension and perceptual reasoning measured by WISC IV. This may be related to the cumulated time spent in foster care, where the environment is likely to be more stimulating and accommodating to cognitive needs by, for example strengthened language stimulation and more steady schooling. We find no evidence that the FCT program has an additional effect on intellectual abilities compared to TAU. Neither the FCT nor TAU seem to benefit other aspects of development and functioning measured in this study. Many factors may have influenced the results. One compelling reason for the poor outcome of the FCT is the low compliance with the program content. On average, more than half of the families in the implementation study spent less than 2.5 h a week on the intervention, and this proportion was rather steady during the intervention. Furthermore, the way foster families worked with the intervention changed over time: The use of the training materials declined, as did the time the foster caregivers spent preparing and planning the tutoring. These declines may indicate that caregivers, to some extent, became familiarized with the techniques and materials, but it may also indicate that their effort to tutor declined, and as time passed, the foster caregivers merely provided supervision of homework completion without much tutoring. The results of the implementation study suggest that, for some families, the self-reliant unstructured framework of the intervention may not be suitable. Declining compliance and attrition are common problems in educational intervention studies in the field of OHC, and as in this study, motivation and time are often barriers to compliance (see e.g. Flynn et al., 2012). However, some studies do have lower attrition rates than the present study (e.g. Forsman, 2019; Hickey & Flynn, 2020; Vinnerljung et al., 2014), which could be related to differences in demands, delivery and structure of the educational programs and/or the inclusion criteria of the studies.

Another potential reason for the poor results of FCT could be that, for some children, the program's content and format may not have been sufficient educational support, considering the highly unfavourable baseline scores. The baseline scores indicate that some of the children had disabilities, intellectually or otherwise. In previous research, placed and maltreated children have persistently demonstrated poorer cognitive outcomes, including lower IQ and poorer EF, than their peers (Evans, 2001; Kavanaugh et al., 2017; Kirke-Smith et al., 2012; Malarbi et al., 2017; Masson et al., 2015; Pears et al., 2010; Tordön et al., 2020; Vinnerljung & Hjern, 2011). Cognitive dysfunction puts a considerable strain on a child's learning potential and hence likely decreases the effect of tutoring. For instance, Hickey and Flynn (2019) demonstrated in a study of one-on-one tutoring of foster children that several factors, including EF, moderated the effect of tutoring. In the present study, the children were, on average, rated in the clinical range (>65) on EF when measured by the BRIEF (Table 4) and obtained average scores of 0.34–0.95 *SD* below the norm scores in the CNT (Table 4). Future interventions of individually tailored tutoring might produce better results if the foster caregivers receive more initial training on how to work with their child's specific special educational needs, besides being offered more ongoing supervision and support to plan, execute and adjust the tutoring over time. On the other hand, many studies of parent tutoring show no moderation of the tutoring effect by factors such as monitoring, supervision of practice and consultation (Erion, 2006). However, we would argue that those results usually stem from structured programs most likely delivered to samples of children with a lower prevalence of cognitive delays and learning difficulties, and where these initiatives are practiced in relation to the implementation of the specific program content, not in the service of individualizing the intervention to suit the children's unique needs. Thus, it is possible that increased monitoring, supervision and consultation would benefit unstructured programs such as the FCT. However, for parent tutoring, only the length of the training of the tutor was found to be a potential moderator (Erion, 2006). Similarly, Nickow et al. (2020) found that professional and paraprofessional tutors yielded better tutoring results than volunteers, which like the amount of initial training, also reflects the positive effect of a highly skilled tutor. The findings by Erion (2006) and Nickow et al. (2020) point to a potential improvement of the FCT by extending the initial training of foster caregivers. Nevertheless, though some adjustments to the structure of FCT may improve the results, the referenced meta-studies of tutoring programs generally show that very few factors seem to moderate the effect of tutoring (Erion, 2006; Ritter et al., 2009). In addition, a recent study of tutoring of children in OHC showed that program length did not moderate the effect (Hickey & Flynn, 2020). The modest number of potential moderators of the tutoring effect indicates that perhaps the most influential factor is how well the tutor can tutor any program type. Hence, it is an obvious limitation of the present study that no data about the practice and quality of the tutoring was obtained.

Besides the absence of any academic progression, the children's psychosocial function (measured by SDQ and TM) did not significantly improve over time. How that affected their academic achievement during the study or vice versa, we cannot say. The interplay between psychosocial function, well-being and academic performance is generally an understudied topic in the research literature (Romano et al., 2015).

4.1 | Limitations

We cannot exclude that baseline differences between the TAU and FCT groups can have influenced the estimated treatment effects, for example via regression to the mean. The fixed-effects regression model, however, does control for baseline differences (via the fixed-effects term) and may, therefore, reduce any bias in the

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estimated treatment effect caused by spurious associations between the treatment effect and baseline differences between TAU and FCT.

Moreover, the study would have benefited from having collected data about the specific homework practices in both the FCT and TAU groups to analyse potential mediation or fidelity. We decided not to collect such data to limit the foster caregivers' workload and reduce the risk of dropout. Furthermore, collecting data throughout the interventions about their homework practices may also directly affect their behaviour; for example the monitoring could incite an increase in the amount of homework support provided by the foster caregivers in the TAU group, and thus bias the effect of FCT compared to TAU.

4.2 | Conclusions and recommendations

In conclusion, it is difficult to determine the potential of the FCT program. With a dropout rate of 24.5% and poor compliance combined with the remaining participants' low response rates during the implementation study, it is impossible to determine whether the program was insufficient or whether the children would have benefited if compliance with the program had been better. We recommend future studies of tutoring to work more preventatively with attrition and low compliance, for example through systematic supervision and consultation on the initiative of the program delivered throughout the implementation. This study employed an ITT analysis design as opposed to including only complying participants in the analysis. Such differences in analysis design might also help to explain some of the differences in the results of this trial and other trials of tutoring programs for children in OHC (e.g. Flynn et al., 2012).

It is possible that some children significantly benefited from the tutoring, but unfortunately, we have too few participants to examine differences in outcomes according to individual and interventional factors possibly relating to the treatment effect. We suggest that future studies of tutoring examine potential mediating and moderating effects of baseline characteristics and differences in the treatment, such as time spent in OHC, age, IQ, and treatment dosage.

DATA AVAILABILITY STATEMENT

Due to the nature of this research, participants of this study did not agree for their data to be shared publicly, so supporting data is not available.

ENDNOTE

[1] Due to the first authors leave from work, the article was submitted for publication 6 years after finishing the data collection.

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How to cite this article: Eiberg, M., & Scavenius, C. (2023). Fostering educational prosperity: A randomized controlled trial of home tutoring in foster care. *Child & Family Social Work*, *28*(3), 774–787. https://doi.org/10.1111/cfs.13003

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