

**Evaluation of Child Care Subsidy Strategies:  
Massachusetts Family Child Care Study  
Executive Summary**

OPRE 2011-1

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Abt Associates Inc.

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## OVERVIEW

This report presents findings from the Massachusetts Family Child Care study, a two-year evaluation designed to examine the impacts on providers and children of an early childhood education program aimed at improving the development and learning opportunities in the care settings and, as a consequence, the outcomes for children in care. The early childhood education program--*LearningGames*<sup>1</sup>--focuses on training caregivers to stimulate children's cognitive, language, and social-emotional development through game-like interactions with individual children across the day. This evaluation of *LearningGames* is one of four state experiments that were conducted as part of the Evaluation of Child Care Subsidy Strategies, whose overall objective is to determine how differences in certain aspects of child care subsidy policies and quality improvement initiatives are related to outcomes for parents, children, and/or child care providers. The study is being conducted by Abt Associates Inc, with its research partners MDRC and the National Center for Children in Poverty of Columbia University, under a contract with the Administration for Children and Families within the U.S. Department of Health and Human Services.

The Massachusetts Family Child Care Study tested the value of an effort to improve the quality and outcomes of family child care, as many low-income families who receive subsidies choose this form of care for their young children. As such, the study addresses important policy questions for Massachusetts and for other states about how to enhance the skills of the early education workforce to improve the quality of children's experience in child care settings. Since home-based providers typically care for a small number of children, family child care appeared to be an environment that could support the development of these individualized, responsive relationships between the provider and the children in care.

*LearningGames* was designed to promote children's cognitive and language development through learning opportunities provided by their caregivers. *LearningGames* focuses in particular on increasing the frequency of rich language interactions between caregivers and individual children. This emphasis grows out of the evidence of the importance of oral language development in children's understanding of words and concepts, in their ability to become competent readers, and in their long-term academic success and of the role that rich language stimulation plays in promoting children's development. This evaluation of *LearningGames* examines the effectiveness of the program in increasing the frequency of rich, stimulating, individualized interactions as a pathway to improved developmental outcomes for the children who are cared for by providers trained on *LearningGames*.

The study addressed two major research questions:

- Did *LearningGames* have significant positive impacts on the developmental support provided by providers to the children in care?

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<sup>1</sup> *LearningGames* is a series of early learning activities developed for the Abecedarian Project. MindNurture, a subsidiary of Teaching Strategies, Inc. created and currently disseminates the curriculum (<http://mindnurture.com>).

- Did *LearningGames* homes have significant positive impacts on developmental outcomes for the children in care?

The study was conducted with a sample of family child care providers that are members of family child care networks in Massachusetts. There were 55 child care networks in the state at the time of the study, and 18 of the 55 met study eligibility criteria of having sufficient home visiting staff to implement the design and having in place a system of general technical assistance for the family child care providers in the network. Fifteen of the 18 networks agreed to participate in the study. Within each network, all eligible family child care providers were recruited, where eligibility was defined as having at least one child less than 36 months of age in care.

In each of the family child care networks, half of the providers who agreed to participate in the study were randomly assigned to *LearningGames* and half were assigned to the control condition. All of the networks who participated in the study indicated that they already provided or would provide two home visits per month to family child care homes. During these visits, the *LearningGames* providers were trained on *LearningGames*. Network administrators selected the home visitors who provided *LearningGames* support from among their staff. The *LearningGames* home visitors did not work with any of the providers in their network who had been assigned to the control group. The home visitors who were chosen to support the *LearningGames* providers were trained on *LearningGames* by the developer. This involved an initial three-day training, with quarterly one-day follow-up trainings and additional technical assistance and support.

## THE *LEARNINGGAMES* APPROACH

*LearningGames* is designed to train caregivers to support children’s development through structured, game-like, one-on-one interactions that promote the child’s acquisition of oral language (vocabulary, concepts) and socio-emotional development. *LearningGames* also encourages caregivers to find opportunities throughout the day to enhance children’s development, by engaging in positive, individualized verbal interactions in the context of play and physical care, as well as in more structured activities such as reading aloud. The *LearningGames* approach includes four primary components:

- ***LearningGames activities.*** 200 games, organized by child age, for providers to use with children from birth to 5 years, along with written descriptions of the games, ways to implement them and parent handouts (English and Spanish) that describe each game.
- ***Enriched caregiving.*** Guidance for providers on how to implement cognitive and language stimulation across all activities during the day, especially during routine care and ordinary activities that may not typically be utilized as learning opportunities for children.
- ***Conversation books.*** Small, informal booklets (4-6 pages), which focus on early language concepts, for the provider to use for one-on-one interactive reading.
- ***Guidance on cognitive developmental sequences.*** Specific instructional sequences for providers to use with children at different stages of development, to help children acquire more sophisticated cognitive skills, in particular, the “3S system” (See, Show, Say) and the “3N system” (Notice, Nudge, Narrate).

In addition, the *LearningGames* approach includes forms for providers to document weekly planning for each child in care, including the games planned and actually used with each child during the week.

*LearningGames* was adapted from a parent curriculum that was first used in the Abecedarian Study, a two-generational intervention in which parents and infants together attended an intensive education program at a center. Infants received high-quality group care with trained teachers, and parents received parenting education and worked with their own children in cognitive-stimulating activities, with coaching and support from program staff. The Abecedarian Program had substantial short-term impacts on infants (Ramey et. al., 2000; Ramey & Campbell, 1984; Campbell & Ramey, 1994) and, in 20-year follow-up studies, has continued to show significant impacts on the children and their mothers (Campbell, Pungello, Miller-Johnson, Burchinal, & Ramey, 2001). While *LearningGames* and its precursor have been studied in center-based care, home visiting programs and parenting programs, it has not been studied previously in family child care homes.

## **IMPLEMENTATION OF *LEARNINGGAMES***

The implementation of the *LearningGames* evaluation involved a complex set of organizational relationships among the state Office of Child Care Services<sup>2</sup>, child care resource and referral (CCR&R) networks, the family child care networks and their providers, and the developer and trainers of *LearningGames*. The implementation of the intervention relied primarily on a “train the trainer” approach. Selected home visiting staff from the participating family child care networks were trained by Dr. Joseph Sparling, the developer of *LearningGames*. Two half-time project coordinators from the CCR&Rs received funding to provide the network home visitors with ongoing support and technical assistance and attempted to maintain monthly contact with them. In the second year of the study, Dr. Sparling and his staff also offered additional direct training on *LearningGames* to participating family child care homes. In turn, home visiting staff were asked to provide training and support to *LearningGames* during two visits each month.

Working with home visitors trained in the approach, *LearningGames* providers were expected to use specific games with individual children, eventually incorporating and deepening each game as time progressed. In addition, they were asked to enrich caregiving routines using the *LearningGames* learning techniques. A home in which *LearningGames* is fully implemented is a language-rich environment in which a provider spends a substantial proportion of her time focusing on and interacting with one or two children at a time, and opportunities for children’s learning and development are provided throughout the day.

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<sup>2</sup> Early in the study the state reorganized its child care and early childhood programs and created the Department of Early Education and Care.

## STUDY DESIGN

The study was a randomized cluster design, with family child care providers assigned to treatment (*LearningGames*) or control (business-as-usual) within networks, and children clustered within provider, so that all children in treatment homes had an opportunity to receive *LearningGames* and all children in control homes received the providers' regular program. The study is intended to be an effectiveness study, in that the impact of *LearningGames* was studied under typical or real-world conditions. Although the study tried its best to achieve high fidelity of implementation across all treatment providers through training and ongoing support, variation in implementation was expected. Since the study was being conducted under real world conditions, providers had control over whether and how well they implemented the intervention procedures.

### Recruitment and Random Assignment

As stated earlier, 18 of the 55 family child care networks that had contracts with the state of Massachusetts were recruited to participate in the study. Of these, 15 ultimately agreed to do so. They, in turn, helped recruit 353 family child care homes to be part of the evaluation. The study used within-agency random assignment so that approximately half of the homes from each network were assigned to the *LearningGames* group and half to the control condition. The process resulted in 173 homes being assigned to *LearningGames* and 180 assigned to the business-as-usual control group.

### Sample Attrition

The sample suffered from substantial attrition of providers between baseline and the posttest, two years after the intervention began. Attrition in the provider sample derives from two sources: individual providers who dropped out of the study (provider-level attrition) and entire agencies that dropped out (agency-level attrition). Since random assignment was conducted within agency, agency attrition resulted in the loss of approximately equal numbers of treatment and control providers. Consequently, loss of an agency does not bias the sample but does reduce the power of the analyses to detect impacts. Provider-level attrition, on the other hand, both reduces power and potentially introduces bias into the sample.

At the end of the two years of implementation of the *LearningGames*, four networks had dropped from the study and the overall attrition rate was 58%. There was higher attrition among the *LearningGames* providers, compared with the control providers (60% versus 55%). About half of the attrition from the provider sample was the result of the four agencies dropping out (108 providers). The remaining attrition was the result of 95 providers who withdrew for individual reasons. The provider-level attrition varied widely across the 18 agencies remaining in the sample after two years. Four of the agencies lost at least half of their providers, while other agencies lost less than 10% of their sample.

The study was designed to assess provider and child outcomes after providers had been implementing *LearningGames* for two years. As shown in Exhibit E.1, the level of provider attrition after two years was 58%, which translates into 150 providers remaining in the study. All

of these providers were part of the observations of provider behavior that were conducted in fall 2007. This level of attrition required adjustment for baseline differences between the samples of *LearningGames* and control providers in the analyses.

**Exhibit E.1: Provider Sample and Attrition Over the Study**

	30 Months Post-Random Assignment (2 Years of Implementation)		
	T (n = 173)	C (n = 180)	Total (n = 353)
Providers Remaining	69	81	150
Overall Attrition	60.1%	55.0%	57.5%
<i>Sources of Attrition</i>			
Agency Attrition <sup>a</sup>	28.9%	32.2%	30.6%
Individual Provider Attrition	31.2%	22.8%	26.9%

At the end of two years of *LearningGames*, the study design called for assessment of outcomes for children in the homes who were between 12 and 60 months. Child assessments were only conducted in homes where there was at least one child enrolled who met three criteria: age (at least 12 months of age and not yet in kindergarten), time in care (at least 6 months in care with provider), and parent permission. In addition, the provider herself had to agree to continue to be part of the study data collection. Child assessments were not conducted in 29 of the 150 provider homes who were observed after two years of implementation. The remaining sample of 121 providers reflects a very high level of cluster attrition, which introduces a potentially high level of bias into the child impact analyses. Further, at the time of the assessments, although 374 children in the sample of participating homes met the study criteria for age and time in care, only 9% of these children had been in the homes for two years, since the time of random assignment. The impact analyses were unable to adequately control for baseline differences in the *LearningGames* and control children who were assessed, since more than 90% of these children were not in care at baseline.

This low proportion of children in the homes at baseline and two years later is not unexpected. First, any children in the homes in spring when the study began who were at least 3 years of age would have entered kindergarten by the time of the assessments and would therefore not be eligible to be tested. Second, over the more than two-year span from baseline to the child assessments, many children would have moved out of the original homes. Even for the 9% of the children who were present in the homes at random assignment and for the assessments, the study does not have child-level baseline data to examine differences between treatment and control children at baseline or to adjust for any differences that do exist.<sup>3</sup> Therefore, the study team

<sup>3</sup> Home visitors were asked to assess children in the homes at baseline using Ages and Stages. By the end of summer 2005, a small percentage of assessments had been done. It was clear that requiring

concluded that the child assessment sample cannot be assumed to support credible analyses of the impact of *LearningGames* on children. Before reaching that conclusion, impact analyses were conducted on the children who were assessed. In the interest of transparency, we have presented the results of these analyses in Appendix B of the full report

## DATA COLLECTION

Data obtained for the study came from multiple sources. To address questions on implementation information came from interviews with providers, home visitors, network administrators, and *LearningGames* trainers; review of tracking documents of technical assistance activities; and ratings of the fidelity of implementation of *LearningGames* conducted by home visitors as well as study staff. To address the research question on provider impacts, provider outcomes were measured through direct observation by the agency home visitors and by independent study staff. Observations of the homes were conducted at three times over the intervention period: at baseline, after one year of implementation of *LearningGames*, and after two years of implementation. The impact analyses focused on the observations undertaken at the end of the intervention. At this time point, all treatment group providers remaining in the sample had been in the study for more than two years, and treatment providers had received at least 24 months of systematic training support on *LearningGames* from the network home visitors. (The range of exposure varies somewhat, depending on the month providers received their initial training.)

The observation measures used for the data collection included:

- The QUEST Caregiver Rating Scale, which assesses the behavior of the adult who is caring for the children in six areas: caring and responding, supporting social-emotional development, supporting play, supporting cognitive development, supporting language development and early literacy, and television and computers.
- The Snapshot of Activities (OMLIT-SNAP), which is a time-sampled description of child activities and groupings, integration of literacy in other activities, and language in the setting. It has two sections. The Environment section describes the number of children and adults present, as well as the type of adult (staff, parents). The Activities section describes activities that are taking place. Then, for each activity, the observer records the number of children and adults in that activity, whether any adult or child is talking, whether they are speaking English or another language, whether any literacy materials are used (text, writing, letters, and if there is singing with the children (distinguished on the measure because of its potential as a phonological awareness/oral language support).
- The Read Aloud Profile (OMLIT-RAP) is a description of adult behavior when reading aloud to children. The RAP records adult behavior during the read-aloud session on supports for comprehension, questions, attention to print knowledge, and vocabulary.
- The TALK, developed for the *LearningGames* study, assesses the extent to which providers engage in extended conversation with individual children, as well as other

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home visitors to complete children's baseline assessments would further delay the implementation of the intervention so this requirement was dropped.

types of one-on-one language interactions that could build children's oral language skills. The TALK codes provider/child verbal interaction in five categories: management or helping, provider only (including provider narrating child's actions), simultaneous verbalization (singing, chanting, rhymes), discussion (short, fewer than 4 turns back and forth), and extended discussion (4 or more back and forth turns, with provider building on child's responses).

- The Arnett Caregiver Interaction Scale (CIS) is a 26-item rating scale that assesses the quality and content of the caregiver's interactions with children. The scale was designed to provide information on various socialization practices that have been identified in research on parenting. The scale can be used without modification in both center and home-based settings. The items measure the emotional tone, discipline style, and responsiveness of the caregiver in the setting.

## **FINDINGS: IMPLEMENTATION OF *LEARNINGGAMES***

### **The Professional Development Model**

The study did not formally measure the fidelity of the professional development model. Evidence on fidelity comes from stakeholder interviews and a review of notes and logs. Together, these sources indicate that the professional development model was partially implemented, in terms of the fidelity of the home visiting protocol, the adherence to twice monthly home visits, and the provision of technical assistance by project coordinators.

The major barriers to implementation fell into three categories, discussed below.

#### ***Roles and Responsibilities for the LearningGames Implementation***

Even initially, the lines of authority for *LearningGames* implementation were complicated and not always clear. They became more complicated when, in the first year of the implementation of the intervention, the Massachusetts Department of Early Education and Care (EEC) decided that while it would endorse the study and provide funding for the intervention, it should not be directly involved in the implementation of the *LearningGames* professional development model.

#### ***Train-the-trainer Approach Using Home Visiting Staff***

The study did not anticipate the amount of time that would actually be needed for home visitors to master the *LearningGames* approach. Some of the home visitors who had relatively low levels of education and child development experience seemed to require even more technical assistance and support than was originally anticipated. Providing home visitors with adequate time for mastery of the approach was further impeded by high home visitor caseloads and a high level of turnover among home visitors. High caseloads also appeared to impede some home visitors in consistently conducting the twice monthly home visits called for by the professional development model.

#### ***Support By Project Coordinators and MindNurture Staff***

Since project coordinators received training at the same time as did the home visiting staff, they did not have the opportunity to master fully the approach before they were asked to support its

use by the home visiting staff. In addition, in the first year of the study, while Dr. Sparling and his staff provided more training than was originally planned, *MindNurture* did not receive the level of resources necessary for staff to be in the state providing direct support to the project coordinators and networks to the degree that likely was needed, in large part because these needs were not well understood prior to implementation. More funding added in Year 2 facilitated his ability to provide more technical assistance to staff as well as direct training to providers.

### Providers' Implementation of the *LearningGames* Program Model

Even though there were barriers to the implementation of the *LearningGames* professional development model, it appears that *LearningGames* providers were using the approach at least to some extent. Abt Associates created an 11-item fidelity rating scale using those items from the provider observation that were most closely aligned with the *LearningGames* approach. The fidelity measures items included practices that could happen in any home; therefore it is possible for the comparison group also to be practicing these behaviors as they are consistent with high-quality caregiver-child interactions. For each of the items on the fidelity measure, a three-point scale was developed, with a rating of “3” indicating that providers were engaging in the activity at a level that would be considered “fully implementing” the *LearningGames* approach. The total number of possible points on the fidelity scale ranged from 11 to 33.

There was a significant difference on the fidelity score between the *LearningGames* providers and the control providers (Exhibit E.2). The average fidelity score for the *LearningGames* providers was 18.4, compared with an average score of 15.3 for the control providers. In addition, we created a score based on the proportion of items on which a provider received a rating of “1,” meaning that they never or infrequently exhibited the behavior; therefore receiving the lowest rating on multiple items was seen as an indicator of low fidelity to the *LearningGames* approach. The average proportion of items with a rating of “1” was 50% for the *LearningGames* providers and 69% for the control providers, which was significantly different. This suggests that the *LearningGames* training was effective at changing the behavior of the family child care providers in line with the *LearningGames* objectives.

**Exhibit E.2. Scores on Fidelity Scale after Two Years of *LearningGames* Intervention by Treatment Status**

Measure	Treatment Providers	Control Providers	Statistical Significance of Difference
	Mean	Mean	<i>p-value</i>
Fidelity rating (out of 33)	18.4	15.3	.03
Proportion of fidelity items where provider scored as “1”	50%	69%	.0001

## FINDINGS: PROVIDER OUTCOMES

### Outcomes after One Year of Implementation

As stated earlier, the sample suffered from significant attrition. Therefore, the first question tested was whether the samples of treatment and control providers who remained in the sample after one year were statistically different from each other, either on demographic characteristics or interactions with children. For the observation measures administered at baseline, the *LearningGames* and control providers in the one-year observation sample did not differ at a statistically significant level on the QUEST Caregiver Rating Scale and the Arnett CIS, which were administered at baseline. In addition, the *LearningGames* and control providers in the one-year observation sample did not differ at a statistically significant level on key demographic characteristics.

The analyses of the one-year provider outcomes were considered exploratory, since the study design called for the primary test of impacts on providers to be based on outcomes at the end of the full two years of the intervention. Differences in the behavior of the treatment and control providers were evaluated based on five observation measures that were administered by independent observers at the end of one year of *LearningGames*.

From instruments administered after one year of implementation, 18 outcomes were constructed to assess the impact of *LearningGames* on family child care providers' instructional approaches and caregiving activities. Some of the outcomes were designed to assess instructional strategies that were specifically targeted by *LearningGames*, particularly those associated with enriched caregiving and interactive book reading. Other outcomes represented high-quality practices to support children's learning and development. Together, the outcomes provided a broad portrait of the types of activities, interactions, and instructional approaches that providers use in family child care homes.

There was a statistically significant difference between the *LearningGames* and control providers on only one of the 18 provider outcomes tested: proportion of time that providers used "enriched caregiving" (Exhibit E.3). This outcome described the provider's introduction of cognitively-stimulating language play and interactions during caregiving routines such as washing hands and eating snack; narrating, talking about, giving feedback on, or asking questions about what children are doing; and nudging children to try something new or to extend an activity by themselves. It should be noted that testing this number of outcomes means that by chance alone, one or two of the contrasts may be significant.

### Exhibit E.3 Impacts on Provider Practices after One Year of *LearningGames* Intervention

	Treatment Providers %	Control Providers %	Statistical Significance of Difference p-value
<b>OMLIT Snapshot of Activities</b>			
Children involved in high-value activities <sup>a</sup>	50.2	53.2	.15
Provider highly involved in children's activities (instructing, reading, discussion)	31.0	32.3	.65
Provider not involved in children's activities	33.0	35.0	.39
<b>Provider Interactions with Children</b>			
Enriched caregiving with one or two children	35.9	28.8	.04*
<b>QUEST Caregiver Rating Scale (1- 3)</b>			
Provider support for cognitive, language, and social development	Mean 2.09	Mean 2.12	.57
<b>Arnett Caregiver Interaction Scale (1- 4)</b>			
Responsive	3.36	3.28	.35
Warm	3.76	3.70	.41
Attached/Engaged	3.63	3.57	.41
Permissive	3.05	3.03	.84
<b>OMLIT Read Aloud Profile</b>			
Reads aloud to one or two children	34.7	32.4	.73
Uses "see, show, say with one or two children	31.6	29.5	.74
Points out features of print	90.8	87.6	.46
Points out sounds/letters or sound-letter link	7.1	12.4	.21
Promotes print motivation	75.5	77.1	.78
Introduces/highlights vocabulary	25.5	25.7	.97
Supports comprehension: provides information	90.8	85.7	.26
Supports comprehension: links to children's experience	31.6	27.6	.53
Supports higher order thinking through the use of questions	12.2	12.4	.98
<i>Sample</i>	98	105	
<sup>a</sup> Includes reading and literacy activities; dramatic, creative, sensory and fine motor play, blocks, and games			
Key: * = p < .05; ** = p < .01			

### Outcomes after Two Years of Implementation

At the time of the two year observations, 150 providers from the originally-assigned sample of 353 providers remained in the study, 69 *LearningGames* providers and 81 control providers.

There were no significant differences between the *LearningGames* and the control providers in the analytic sample on the QUEST Caregiver Rating Scale and the Arnett CIS. Also, as with the Year 1 sample, for selected demographic variables, the *LearningGames* and control providers remaining in the analytic sample were not statistically different.

Three over-arching constructs were developed from the observation measures as two-year outcomes for the analysis of impacts of *LearningGames* on providers. The constructs were developed to align closely with the objectives of the *LearningGames* program. Although the set of observation measures that were administered at posttest provided a rich set of data that could be used to assess impacts on providers, the analyses used a small number of constructs to avoid problems associated with multiple comparisons. That is, when a study examines many outcomes or findings simultaneously, the statistical significance of findings may be overstated. Without accounting for these multiple comparisons, the likelihood of finding a statistically significant finding increases with the number of comparisons.

For the two-year impact study, our objective was to create three reliable constructs that, based on the items that made up each construct, measured outcomes that were aligned with the outcome goals of the intervention.. Specifically we developed constructs that measured the following:

- The amount of time the provider was engaged with individual or pairs of children in extended language interactions with cognitively-rich content to assess the provider's engagement in *LearningGames* activities (or *LearningGames*-like activities);
- The provider's availability to, positive interactions with, and responsiveness to children, across all activity contexts to assess the provider's responsiveness to children; and
- The extent to which the provider supported children's oral language comprehension, across all activity contexts to assess the provider's support for learning vocabulary and concepts, as in the interactive book reading,

In Year 2, *LearningGames* had statistically significant impacts on all three provider outcomes. That is, compared with the control providers, the *LearningGames* providers had substantially higher frequencies of rich oral language interactions and of interactions presumed to support children's understanding of vocabulary or concepts, and they had significantly higher ratings on their responsiveness to the children. The effect sizes for the treatment-control differences were nearly half a standard deviation, which by convention is labeled a moderate effect size. Also, none of the provider baseline covariates was a statistically significant predictor of the three provider outcomes. The consistency of the findings suggests that the *LearningGames* intervention, despite the apparent variability in the extent to which providers implemented a fully-realized model, was able to make a significant difference in how providers talked to and interacted with the children in their care. (See Exhibit E.4.)

**Exhibit E.4: Impacts of *LearningGames* on Provider Behavior**

	Control Group Mean	Treatment Group Mean	Treatment Effect	SE	Statistical Significance of Impact (t-value)
Rich oral language interactions	-0.18	0.22	0.40**	0.11	3.72
Support for development of vocabulary/comprehension	-0.17	0.20	0.37**	0.10	3.58
Responsiveness to children	-0.19	0.23	0.47**	0.16	2.97

Key:\* =  $p < 0.05$ ; \*\* =  $p < 0.01$

## CONCLUSION

We believe that further study of *LearningGames* in family child care is merited for two major reasons: (1) the study was able to show impacts on providers despite substantial variation in implementation of the professional development model; and (2) the study was not able to provide evidence of whether or not the changes in providers led to meaningful improvements in child outcomes. Both of these points are discussed below.

This study showed that *LearningGames* had statistically significant positive impacts on the behavior of the family child care providers who received up to two years of support in implementing the program. *LearningGames* was effective at promoting high-quality, individualized and small group interactions between providers and children, which have been shown in previous research to be associated with children’s cognitive and language development. The effect sizes of these outcomes ranged from .37 to .47 standard deviations, which the field considers to be of moderate size. The study identified many barriers to implementation of the professional development model that could be addressed in future implementations. With a stronger implementation model, it is possible that the impacts on providers could have been larger than occurred in the Massachusetts implementation.

Further, the study could not provide credible evidence about the impacts of *LearningGames* on children, since the high level of attrition in the child sample and the lack of a baseline assessment to verify that observable characteristics across the treatment and control group children assessed did not differ posed insurmountable threats to the internal validity of the estimates. This was compounded by threats to external validity, since there was no way to compare the assessed sample to the original one.