



The *We Grow Together* Professional Development System

Final Report of the 2019 Field Test

December, 2020

Sally Atkins-Burnett, Louisa Tarullo, Shannon Monahan, Felicia Hurwitz, Timothy Bruursema, Ann Li, Elizabeth Blesson, Judy Cannon, Ayesha De Mond, and Anna Heckler

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Executive Summary

A. Overview of the WGT project

The We Grow Together Professional Development System (WGT) aims to improve the quality of caregiving in early childhood settings by helping infant-toddler caregivers understand how their interactions with young children support child development. The system includes training, strategies, and materials aligned with the principles and practices of the Quality of Caregiver-Child Interactions for Infant and Toddlers (Q-CCIIT) observational measure (Atkins-Burnett et al. 2015). Local professional development (PD) providers¹ support caregivers as they implement practices intended to promote infant and toddler social-emotional, cognitive, and language and literacy development. The system is designed for use in center-based classrooms and family child care homes (FCCs), in both Early Head Start (EHS) and community-based settings.²

Mathematica and our partners developed WGT as part of a project, Professional Development Tools to Improve the Quality of Infant and Toddler Care, funded in 2015 by the Office of Planning, Research, and Evaluation (OPRE) in the Administration for Children and Families (ACF), U.S. Department of Health and Human Services. We designed this project to support ACF's vision for helping early care and education (ECE) programs and staff deliver quality services that promote positive outcomes for young children.

For a field test of WGT during fall 2018 to spring 2019, Q-CCIIT observations at baseline informed the selection of areas for growth in the caregivers' practices. PD providers and caregivers could then select from an array of PD tools based on constructs and competencies in the Q-CCIIT measure. We organized these tools into nine web-based modules, or sections, designed to support infants' and toddlers' (1) language and literacy development, (2) social and emotional development, and (3) cognitive development. We further divided these modules into key practices that enabled caregivers to explore skills and exercise new caregiving techniques.

To accommodate diversity in learning preferences, WGT provided varied resources. Videos, handouts, and presentations introduced and demonstrated each key practice to provide shared understanding of WGT foundational principles and practices. We made handouts available to share with colleagues/supervisors and families to ensure the entire caregiving team was involved in supporting and using the key practice. Checklists and self-reflection questions on the WGT website offered support for collaborative progress monitoring, self-reflections, and feedback. Using surveys and web analytics, we collected information about the characteristics, background, knowledge, beliefs, and user experiences of the caregivers and PD providers who participated in the field test. Exhibit ES.1 provides an overview of the WGT modules.

¹ Throughout, we refer to “caregivers” as representing nonparental caregivers and teachers in Early Head Start (EHS), community-based child care centers, and family child care (FCC) homes. We refer to “PD providers” as representing a range of ECE staff who provide professional development, both within programs and employed by outside entities, such as managers and education directors, supervisors, mentors, coaches, employees of technical assistance (TA) networks or centers, and master teachers in the ECE setting.

² Throughout, we refer to “classrooms” as representing both center-based and FCC settings.

Exhibit ES.1. WGT PD modules

MODULE	OBJECTIVES Caregivers will learn and implement best practices such as:
 <p>Support Social-Emotional Development: Caregiver-Child Relationships</p>	<ul style="list-style-type: none"> • Responding to children’s social cues • Responding to children’s emotional cues • Responding to children in distress • Building a positive relationship • Supervising and joining in play and activities
 <p>Support Children’s Language Use</p>	<ul style="list-style-type: none"> • Responding to children’s cues • Taking turns in conversation • Asking questions • Extending children’s language use • Supporting children’s use of new words
 <p>Support Children’s Understanding of Language</p>	<ul style="list-style-type: none"> • Using different types of talk • Using lots of specific and new words • Supporting learning about concepts • Engaging children in books • Using themes and projects
 <p>Support Social-Emotional Development: Regulation of Behavior and Emotions</p>	<ul style="list-style-type: none"> • Using responsive routines • Managing behavior and setting limits • Responding to emotional cues • Supporting self-regulation
 <p>Support Social-Emotional Development: Support Non-Mobile Infants’ Peer Interactions</p>	<ul style="list-style-type: none"> • Supporting peer interaction and play • Creating a sense of belonging • Supervising and joining in play and activities
 <p>Support Social-Emotional Development: Support Toddlers’ Peer Interactions</p>	<ul style="list-style-type: none"> • Supporting peer interaction and play • Extending pretend play • Supporting social problem solving • Creating a sense of belonging
 <p>Support Literacy</p>	<ul style="list-style-type: none"> • Engaging children in books • Encouraging a positive attitude toward books • Using new words and sentences • Making connections to things not present
 <p>Support Infants’ Cognitive Development</p>	<ul style="list-style-type: none"> • Supporting object exploration • Supporting children in making choices • Supporting learning about concepts • Extending knowledge about the world
 <p>Support Toddlers’ Cognitive Development</p>	<ul style="list-style-type: none"> • Scaffolding problem solving • Supporting children in making choices • Extending pretend play • Extending knowledge about the world

Together, the PD provider and caregiver set goals for the PD process. These goals then directed an active change phase, during which the caregiver and PD provider used tools from the website to develop an action plan and implement new practices. When caregivers first accessed the WGT website, we asked them to complete a brief web survey on their learning preferences; we then shared results with PD providers to assist in tailoring their coaching approach and tool recommendations. Through PD training, PD providers learned how to develop SMART (specific, measurable, attainable, relevant, and timely) goals and action plans. We encouraged each PD provider to recommend specific resources based on the caregiver's skills, goals, and learning preferences. PD providers could also point the caregiver to supplementary WGT resources, including questions to ask children (available on key rings), posters of descriptive vocabulary and concepts, and other classroom supports that helped to facilitate the application of new skills. The level of intensity and duration needed to learn a key practice varied with the complexity of that practice and characteristics of the setting, and by caregiver (for example, the caregiver's motivation and background experience).

B. Research questions guiding the WGT field test

After careful, iterative development of the WGT resources and system, we designed the field test to implement and examine WGT in real world settings. We expected that use of the WGT system would promote sustained, high quality, and responsive caregiving that supported children's development and increased caregivers' knowledge of child development and quality caregiving. Exhibit ES.2 lists the specific research questions comprising the focus of the field test.

Exhibit ES.2. WGT research questions

Research questions (RQs)

1a. Who are the participants in the WGT field test?

1b. What tools and support help early childhood professionals to use the responsive caregiving principles covered by WGT to improve caregiver-child interactions?

- a. How frequently do caregivers and PD providers make use of WGT over the implementation period, and which tools did they access?
 - b. How do caregivers and PD providers engage with the technological components of WGT (that is, usability of the website, accessing the website and tools within it, using the tablets)?
 - c. Are participants satisfied with WGT (both the content and tool types, such as the narrated presentations, summary handouts, and step-by-step guides)?
 - d. Are participants satisfied with the PD process (goal setting, action planning, practice and observation, reflection, feedback, trusting relationship)?
 - e. What are the challenges and barriers to WGT implementation in infant/toddler settings?
 - f. Do answers to these questions differ by subgroups (caregivers and PD providers associated with FCCs versus center-based settings, or EHS versus community-based settings) or characteristics of caregivers and providers? (See Table III.1 for more information.)
-

Research questions (RQs)

2. Can WGT be used by early childhood professionals to support change in beliefs, knowledge, or practice concerning infants and toddlers?³

- a. Is four months' implementation of WGT associated with change in the quality of caregiver-child interactions, as measured by Q-CCIIT instrument scores (fall to spring)?
 - b. Is four months' implementation of WGT associated with change in caregivers' and PD providers' beliefs and knowledge about child development and caregiving or change in caregivers' self-efficacy as teachers (fall to spring)?
 - c. Does the PD provider perceive change in the PD provider's own practice after PD providers' training and four months' implementation of WGT?
 - d. Does the caregiver perceive change in the caregiver's own practice after four months' implementation of Q-CCIIT PD tools?
 - e. Do answers to these questions differ by subgroups (caregivers and PD providers associated with FCCs versus center-based settings) or characteristics of caregivers and providers? (See Table III.1 for more information.)
-

C. Implementation of WGT in the field test

Site selection. Our goal was to recruit 300 pairs of caregivers and their local PD providers to participate in the WGT intervention, which spanned a four-month period. We targeted 10 geographic areas that included EHS, community-based centers, and FCC settings serving infants and toddlers. To select our geographic areas, we considered states that experts had recommended, using key criteria. They included states with PD registries; states with PD requirements or standards for PD providers or coaches; states with PD requirements for caregivers (for example, required minimum number of hours); and states with infant/toddler or mental health specialists, who serve as PD providers for FCCs in some states.

Participant recruitment. We aimed to recruit 175 center-based caregivers (half of them caregivers for infants and half for toddlers) and 125 FCC providers. By fall 2018, we recruited a purposive sample of 310 pairs, comprising 310 caregivers and 187 PD providers (some of the latter would be paired with more than 1 caregiver). Because of attrition, we used a set of minimum participation criteria to define the final analytic sample. The final field test analytic sample included 271 pairs, comprising 271 caregivers and 168 PD providers. Of the 168 PD providers, 93 were paired with more than 1 caregiver. The sample included 214 center-based classrooms (89 affiliated with EHS and 125 community-based child care programs) and 57 FCCs, of which 16 were affiliated with EHS (Exhibit ES.3).

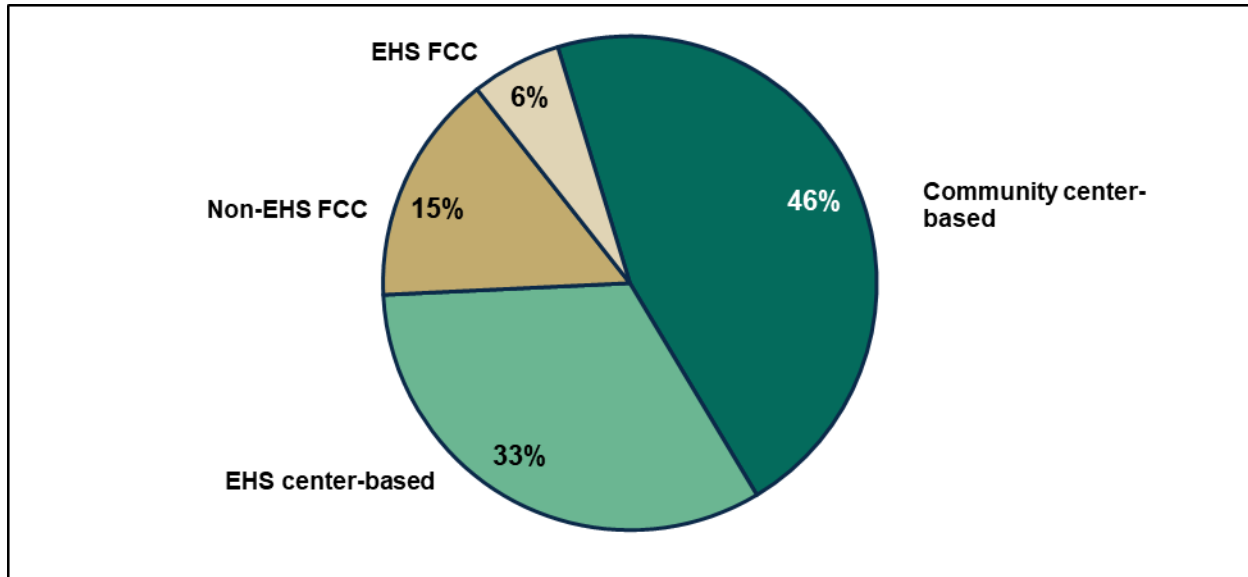
Survey data collection. From September 2018 to January 2019, we asked all caregivers and PD providers in the analytic sample to report information via a web survey about topics such as their background characteristics (for example, demographics, education, and experience) and knowledge and beliefs about child development. Some topics were specific to caregivers, such as their willingness to change their practices; some were specific to PD providers, such as their experience providing PD. We achieved a 98 percent response rate for the PD provider background survey and a 97 percent response rate for the caregiver background survey in the analytic sample.

At three monthly intervals during implementation of the WGT program, we asked caregivers and PD providers to complete brief pop-up surveys about how they were using the PD materials outside of the

³ We developed the field test using a pre-post design. Findings from these research questions should not be interpreted as causal because we did not include a comparison group.

time they spent on the website, and how they were working together (for example, how frequently caregivers had attended meetings with the PD provider in the last month, and what their methods of communication had been). Unfortunately, the response rates were low for these surveys, limiting the dosage information available about the activities of caregivers and PD providers outside of the website.

Exhibit ES.3. Final WGT analytic sample pairs, by type of caregiver setting



Source: Fall 2018 WGT Classroom roster.

After completion of the WGT program’s implementation, we asked all caregivers and PD providers in the analytic sample to fill out web-based feedback surveys from May 2019 through July 2019. The feedback surveys for each type of respondent included a subset of the questions from the background survey and new items related to experiences with the WGT system. For example, the feedback surveys asked about satisfaction with PD (tools, website, process, and content), any changes in practices, and awareness of and access to available resources. We also collected information on the challenges caregivers and PD providers faced in balancing their ongoing work with PD activities. We asked the caregivers how satisfied they were with their relationship with the PD provider—for example, whether the caregiver believed the PD provider showed trust and respect for them. We achieved a 90 percent response rate for the PD provider feedback survey and a 93 percent response rate for the caregiver feedback survey in the analytic sample.

Observational data collection. To conduct the Q-CCIIT observation in each participating classroom, we led two in-person observer trainings, one in August 2018 to prepare for fall data collection and a second one, a remote refresher training in spring 2019, to prepare for spring data collection. In fall 2018, 23 certified observers completed 301 Q-CCIIT observations in caregivers’ classrooms. In spring 2019, 15 certified observers completed observations in 245 classrooms. With only one exception, the observers completed their observations for all caregivers still working in their original classrooms.

PD provider training. The PD provider training took place four weeks before the WGT implementation period—between November and December 2018. Ninety-nine percent of PD providers in the analytic sample participated in the PD provider training, during which we hosted three live 90-minute training

webinars over four weeks to introduce WGT, demonstrate website navigation, discuss study logistics, and answer PD providers' questions. We made each training webinar a requirement and offered them twice to accommodate PD providers' schedules. In between training webinars, we required the PD providers to log onto the website to complete training activities, which we tracked through web usage data.

PD provider supports for WGT implementation. We provided technical assistance (TA) to PD providers during the training and implementation periods. We made a phone hotline available to offer TA in accessing the WGT website and materials. In addition, we monitored the study email address for questions or comments from participants. We also provided a discussion board on the website for PD providers to anonymously post questions or comments about PD. Senior members of the WGT project team also held monthly office hours. PD providers were able to schedule times for team members to offer them one-on-one information about the PD materials and strategies for working with their caregivers. The WGT team also responded to PD providers' discussion board posts by addressing questions raised in the posts and asking questions to encourage reflection, feedback, and celebration of successes.

During the implementation period, we encouraged PD providers to use the PD provider tools on the website to support their work with caregivers. We also hosted three optional one-hour live implementation webinars, which we made available in February, March, and April 2019. The first one addressed areas for which PD providers had noted the need for more information or training (in the survey at the end of their initial training.) For the next two implementation webinars, we asked PD providers to submit questions for the trainers in advance.⁴

Recommended modules based on Q-CCIIT scores. We used individual caregivers' Q-CCIIT scores from the fall classroom observations to inform which three WGT modules to highlight on each caregiver's home page on the WGT website. Caregivers and their PD providers could see and access the three recommended modules at the start of the implementation period (January 2019).

Although we guided caregivers to three specific modules, they coordinated with their PD providers to choose which of the key practices within the modules they would target. The primary goal in initially presenting only three modules was to guide caregivers to modules about practices on which they could improve, based on their Q-CCIIT observation. Participants also could access the other WGT modules if they chose. Once caregiver-PD provider pairs selected the first module on which to focus, they set goals for practice and worked at their own pace to implement new skills.

Web usage data. From November 2018 through April 2019, we collected web user tracking data from the WGT website on both caregivers and PD providers, noting login frequency, tools accessed, and length of time spent on the website.

Ongoing support and TA. Participants could use the website and contact the WGT study team for TA throughout the implementation period.

D. WGT analytic plan

Exhibit ES.4 displays the analysis methods and sources we used to answer each research and sub-research question.

⁴ We offered each live webinar twice to maximize participation across time zones; one of each of these webinars was audio-recorded and available via the website.

Exhibit ES.4. WGT research question, by analysis methods and sources

Research question	Analysis methods	Sources
RQ1a. Who are the participants in the WGT field test?		
Who are the participants in the WGT field test?	<ul style="list-style-type: none"> • Descriptive analyses (means and standard deviations, range of responses) • Tests of significance of group differences between center-based classrooms and FCCs, and between EHS and community-based settings 	<ul style="list-style-type: none"> • Background survey • Classroom roster • Sample management system (SMS)
RQ1b. What tools and support help early childhood professionals to use the responsive caregiving principles covered by WGT to improve caregiver-child interactions?		
How frequently do caregivers and PD providers make use of WGT over the implementation period, and which tools do they access?	<ul style="list-style-type: none"> • Descriptive analyses (means and standard deviations, range of responses) 	<ul style="list-style-type: none"> • Feedback survey • Web usage data
How do caregivers and PD providers engage with the technological components of WGT (that is, usability of the website, accessing the website and tools within it, using the tablets)?	<ul style="list-style-type: none"> • Descriptive analyses (means and standard deviations, range of responses) 	<ul style="list-style-type: none"> • Feedback survey • Help desk documentation • Web usage data
Are participants satisfied with WGT (both the content and the tool types, such as the narrated presentations, summary handouts, and step-by-step guides)?	<ul style="list-style-type: none"> • Descriptive analyses (means and standard deviations, range of responses) • Bivariate correlations 	<ul style="list-style-type: none"> • Feedback survey • Help desk documentation
Are participants satisfied with the PD process (goal setting, action planning, practice and observation, reflection, feedback, trusting relationship)?	<ul style="list-style-type: none"> • Descriptive analyses (means and standard deviations, range of responses) • Content analysis 	<ul style="list-style-type: none"> • Feedback survey • Help desk documentation
What are the challenges and barriers to WGT implementation in infant/toddler settings?	<ul style="list-style-type: none"> • Descriptive analyses (means and standard deviations, range of responses) • Content analysis 	<ul style="list-style-type: none"> • Feedback survey • Help desk documentation • WGT documentation^a
Do answers to any of these primary questions differ by subgroups (caregivers and PD providers associated with FCCs versus center-based settings) or characteristics of caregivers and providers?	<ul style="list-style-type: none"> • Tests of significance of group differences between center-based classrooms and FCCs, and between EHS and community-based settings 	<ul style="list-style-type: none"> • Feedback survey • Classroom roster • SMS
RQ2. Can WGT be used by early childhood professionals to support change in beliefs, knowledge, or practice concerning infants and toddlers?		
Is four months' implementation of WGT associated with change in the quality of caregiver-child interactions, as measured by Q-CCIIT instrument scores (fall to spring)?	<ul style="list-style-type: none"> • Descriptive analyses (means and standard deviations, range of responses); t-tests of fall and spring means 	<ul style="list-style-type: none"> • Q-CCIIT observation scores
Is four months' implementation of WGT associated with change in caregivers' and PD providers' beliefs and knowledge about child development and caregiving (fall to spring)?	<ul style="list-style-type: none"> • Descriptive analyses (means and standard deviations, range of responses); t-tests of fall and spring means 	<ul style="list-style-type: none"> • Background survey • Feedback survey
Is four months' implementation of WGT associated with change in caregivers' self-efficacy as teachers (fall to spring)?	<ul style="list-style-type: none"> • Descriptive analyses (means and standard deviations, range of responses); t-tests 	<ul style="list-style-type: none"> • Background survey • Feedback survey

Research question	Analysis methods	Sources
Does the PD provider perceive change in the PD provider's own practice after PD providers' training and four months' implementation of WGT?	<ul style="list-style-type: none"> • Descriptive analyses (means and standard deviations, range of responses) 	<ul style="list-style-type: none"> • Feedback survey
Does the caregiver perceive change in the caregiver's own practice after four months' implementation of Q-CCIIT PD tools?	<ul style="list-style-type: none"> • Descriptive analyses (means and standard deviations, range of responses); t-tests 	<ul style="list-style-type: none"> • Feedback survey
Do answers to these questions differ by subgroups (caregivers and PD providers associated with FCCs versus center-based settings) or characteristics of caregivers and providers?	<ul style="list-style-type: none"> • Tests of significance of group differences between center-based classrooms and FCCs, and between EHS and community-based settings • Multivariate regression analyses 	<ul style="list-style-type: none"> • Q-CCIIT observation scores • Background survey • Feedback survey • Classroom roster • SMS • WGT documentation (PD provider webinars)

^aWGT documentation includes PD provider attendance at training and webinars, PD provider discussion boards, webinars, and office-hour phone calls.

Multivariate analyses and multiple imputation

Most PD providers served two caregivers but could serve as many as five. To account for this situation in analyses, we used hierarchical linear models (HLM) to examine change in caregivers' observed practices and self-reported knowledge and beliefs. The outcomes in the different models were the full Q-CCIIT W-score,⁵ the three Q-CCIIT domain W-scores, the caregiver-reported teacher self-efficacy (Teacher Opinion Survey; Geller and Lynch 1999) in the spring, and the caregiver's knowledge and beliefs as measured by the spring Early Head Start Family and Child Experiences Study (Baby FACES) Beliefs about Development scale.

With the unimputed data, we conducted unconditional models (without covariates) to examine the percentage of the variance in caregiver quality at the caregiver and PD provider levels. The PD provider level did not explain variance in the Q-CCIIT spring scores. After adding covariates in the model, none of the PD provider variables was significant in predicting any of the spring Q-CCIIT observation scores.

With the PD provider level not contributing significant variance, we added PD provider characteristics to the record of the caregiver partner(s) and used Full Information Maximum Likelihood (FIML) in Mplus (Muthén and Muthén 1998–2012) to estimate models that account for the missingness. FIML models impute for missing model predictors but not outcomes.

We simplified the models to limit to variables with stronger explanatory power and avoid missing significant associations when related variables in the model were associated with one another. We used the same set of covariates across models (with the relevant fall score used for each outcome) to allow for comparisons. After estimating in FIML, we tested our findings using multiple imputation and re-estimating the HLMs using *miAnalyze* with the 20 imputed data sets (Appendix F).

⁵ W-scores (Woodcock 1999) are based on item response theory (IRT) results and are useful scores for examining growth. W-scores have a mean difficulty of 500 and have properties that support criterion-referenced interpretation.

E. Highlights of study findings

1. Who were the caregivers in the WGT field test?

The WGT study sample comprised 271 PD provider-caregiver pairs—271 caregivers and 168 PD providers from EHS and community-based centers and FCCs (some PD providers were paired with more than 1 caregiver). *The caregiver sample was racially/ethnically diverse and primarily female.* Forty-six percent of WGT caregivers identified as White, 38.8 percent as Black/African American, 24.8 percent as Hispanic/Latino, 5.3 percent as Asian, 4.9 percent as American Indian/Alaska Native, and 0.4 percent as Native Hawaiian/Pacific Islander. The caregiver sample was 98.8 percent female. *They had an average of 11.2 years of experience in ECE. About half of the sample of WGT caregivers (49.8 percent) had received an associate's degree or higher.* However, education levels differed by caregiver subgroup, with EHS caregivers generally reporting higher education levels than their community-based counterparts; for example, more EHS than community-based caregivers reported a bachelor's degree as their highest level of education (27.6 and 15.3 percent, respectively).

Most caregivers had prior experience participating in PD activities before beginning WGT. Almost three-quarters of caregivers reported having a mentor, coach, or other PD provider before the study (72.9 percent). Almost half of all caregivers had a previous relationship with the WGT PD provider with whom they worked during this project (48.6 percent) and, on average, reported having a positive relationship with this PD provider (mean of 3.8 on a 4-point rating scale).

In fall 2018, caregivers reported satisfaction in working with infants and toddlers, and expressed being open to improving their practice as they embarked on WGT. Caregivers reported being very likely to continue working in infant/toddler care, particularly if they worked in FCCs (84.4 percent overall, 98.2 percent FCCs). In fall 2018, 91.6 percent of caregivers endorsed being ready to change or already actively engaged in change on a Stage of Change scale.

2. Who were the PD providers in the WGT field test?

In fall 2018, most WGT PD providers were internal coaches in their respective settings (59.2 percent), typically worked with 13–14 caregivers on an ongoing basis, and were supervisors of the caregivers they coached (63 percent of caregivers reported their PD provider was also their supervisor). The PD providers were not as racially/ethnically diverse as the caregivers. Most PD providers were White (55.4 percent) and female (97.6 percent). About three-quarters of PD providers had attained a bachelor's degree or higher (75.8 percent); about one-quarter had earned a master's degree or higher (25.5 percent). ECE was their primary degree field (42.8 percent), and more than half reported membership in a professional organization or network (56.5 percent).

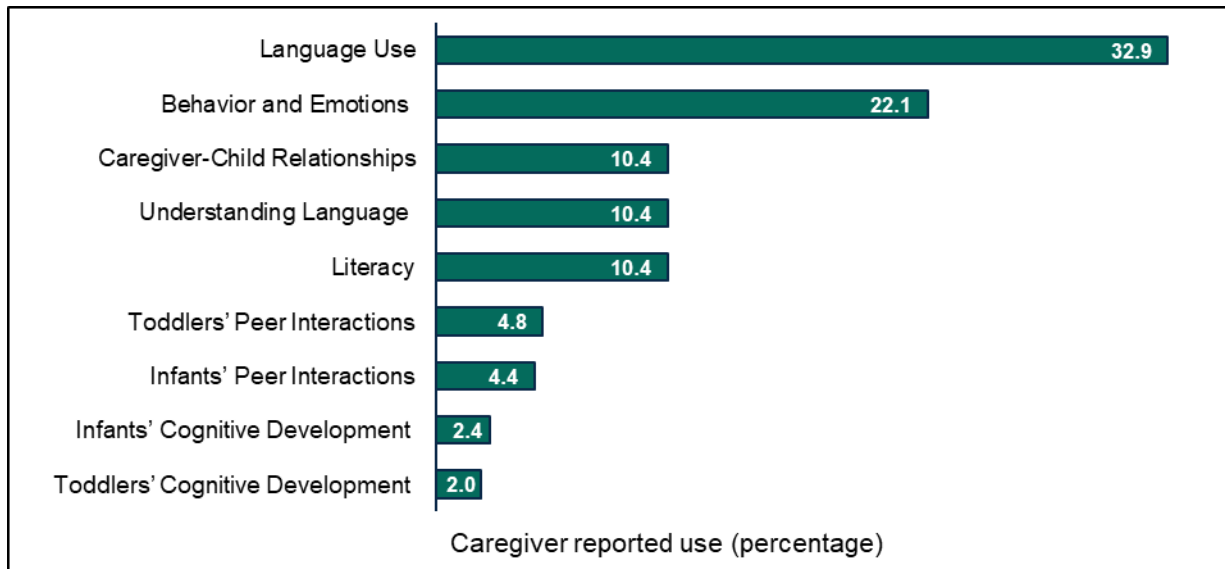
WGT participants are not representative of PD providers and caregivers nationally. They agreed to participate in an intensive online PD program for approximately four months, with an additional month for PD provider remote training. They were comfortable using written materials in English. Therefore, readers should not use these data to draw conclusions about the PD experiences of PD providers and caregivers nationally.

3. In which WGT modules did caregivers and PD providers report spending most of their time?

WGT modules provided a comprehensive range of domains of child development that caregiver and PD providers could use to improve their practice. Based on their baseline Q-CCIIT observation, we

recommended that most caregivers use the Language Use module in WGT (77.2 percent). The other two most frequently recommended modules were the Understanding of Language (69.3 percent) and Literacy (57.5 percent) modules. PD providers most commonly reported using those three modules with their caregivers (76.7, 58.7, and 50.7 percent, respectively), as well as the Support for Children’s Behavior and Emotions module (51.3 percent). Similarly, *the majority of the WGT caregivers reported spending most of their time in the Language Use (32.9 percent of caregivers) or Behavior and Emotions (22.1 percent) modules; fewer reported spending most of their time in the Understanding Language or Literacy modules (10.4 percent for each; Exhibit ES.5).*

Exhibit ES.5. WGT caregivers reported most frequent use of the Language Use and Behavior and Emotions modules



Source: Spring 2019 WGT Caregiver and PD Provider Feedback Surveys.

Note: Three modules were recommended to each caregiver based on scores on the positive Q-CCIIT scales, but PD providers were given permission to introduce other modules’ key practices as needed, based on their observations. Caregivers collaboratively selected practices within modules and created goals with the PD providers

4. How did caregivers access and respond to WGT materials?

Most caregivers logged onto the WGT website through a tablet provided by the study (74.7 percent); regardless of the device, most used Wi-Fi (81.1 percent). Although some caregivers experienced challenges at first in accessing the technological components of WGT, by the end of the study they reported the website was easy to use once they logged on (96.0 percent).

Across settings, caregivers who tried a WGT activity reported it to be useful (mean ratings between 3.9 and 4.4 on a 5-point scale). The activities most commonly reported as useful were trying WGT practices in their classroom (mean of 4.4, n = 245), engaging in self-reflection (mean of 4.2, n = 235), and receiving feedback from their PD provider (mean of 4.3, n = 231). Nearly all caregivers used the iPad tablet to video-record their practice (92.6 percent); of those who did so, most found it useful (mean of 4.1, n = 219).

Center-based caregivers felt supported by leadership and peers in their settings during WGT implementation (mean ratings of 4.8 and 4.9, respectively, on a 6-point scale). However, on average, caregivers reported challenges in finding time to participate in WGT activities, given their already busy schedules and many job responsibilities. These challenges included finding time to use online materials or practice with children, and having a PD provider who was too busy (21.5 percent). A greater percentage of FCC caregivers than center-based caregivers reported working more than eight hours a day (74.5 percent compared with 26.7 percent), leaving little time for PD activities.

Caregivers reported having positive and trusting relationships with their PD providers (mean ratings of between 3.7 and 3.9 on a 4-point scale) and collaborating to set goals (mean rating of 4.9 on a 6-point scale). Despite challenges in finding time to meet, most of them met more than once a month (67.4 percent), including both in person and via virtual meetings.

More than 91 percent of caregivers overall and across different settings agreed they had a positive experience with WGT. Caregivers most commonly agreed that WGT provided useful resources and helped them become more effective in interacting with children (99.6 percent and 98.4 percent, respectively). Nearly all caregivers (more than 98 percent) across settings and WGT practices agreed that using these practices helped infants and toddlers (overall mean agreement rating of 5.3 on a 6-point scale)—especially with their development of language and literacy (98.4 percent and 98.8 percent, respectively).

5. How did PD providers respond to WGT materials?

Most PD providers who tried WGT coaching activities reported being satisfied with them (mean ratings between 3.7 and 4.4 on a 5-point scale), most commonly with observing caregiver practice via video or in person (mean of 4.4), providing feedback to caregivers (mean of 4.3), and action planning activities (mean of 4.2). PD providers tended to spend more time on the WGT website reviewing coaching materials and training modules than reviewing the content in caregivers' recommended modules (68 percent compared with 15 percent). Similar to caregivers, PD providers reported challenges that prevented them from meeting with their caregivers, including finding time (50.7 percent) and dealing with additional work responsibilities (26.0 percent).

6. Did WGT support change in caregivers' beliefs and knowledge?⁶

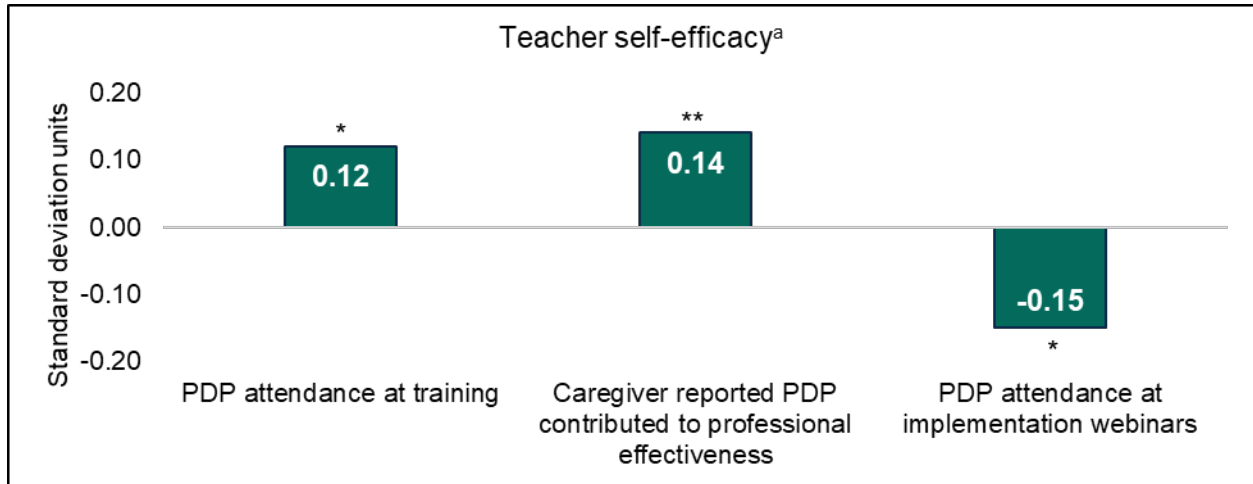
WGT caregivers agreed more with evidence-based beliefs about practices supporting language development in spring 2019 than in fall 2018. These practices formed the basis of WGT resources. We found an increase in this self-reported measure for the full sample and in each setting subgroup. The finding is consistent with the type of module in which caregivers spent most of their time working—as reported above, more than half of caregivers worked primarily on one of the three language modules. Change was not detected for beliefs about supporting social-emotional development, supporting cognitive development, or knowledge of child development (see Exhibit ES.6).

Caregivers reported change in their ability to be effective in providing care for infants and toddlers, with an increase in their teacher self-efficacy related to their WGT experiences (mean score of 4.6 to 4.8 on a 6-point scale). After controlling for caregiver, classroom, and program characteristics and fall score, the number of WGT training webinars that their PD providers attended and the caregivers' report of how

⁶ We developed the field test using a pre-post design. Findings should not be interpreted as causal because we did not include a comparison group.

much the PD provider contributed to their professional effectiveness were positively associated with their spring self-efficacy score. However, PD provider attendance at more of the implementation webinars was negatively associated with the caregiver’s report of self-efficacy (Exhibit ES.6). Although open to all PD providers, the implementation webinars were optional and designed to address the needs of providers who expressed concerns or had difficulty understanding how to implement key WGT activities after training.

Exhibit ES.6. Caregivers who reported their PD provider contributed to their professional effectiveness and had PD providers who attended more WGT training webinars reported stronger self-efficacy in spring 2019



Source: Spring 2019 WGT Caregiver Feedback Survey and PD provider attendance at WGT initial training and implementation webinars.

Note: PDP = PD provider. Models were estimated with full information maximum likelihood. Covariates include teacher self-efficacy (z-score) in the fall, beliefs about development and practice in the fall, experience in ECE, the Kessler-6 scores, class/group size, caregiver: child ratio, whether classroom served toddlers, and setting type (with community-based as the referent). *p ≤ 0.05; **p ≤ 0.01; ***p ≤ 0.001.

^a Geller, S., and K.B. Lynch. Teacher Opinion Survey [Measurement Instrument]. Virginia Commonwealth University Intellectual Property Foundation and Wingspan, LLC, 1999.

After controlling for caregiver and setting characteristics, none of the indicators of WGT PD provider involvement in WGT training was significantly associated with spring caregiver reports of beliefs about development. Caregivers’ fall beliefs about development, class size, and being in an EHS setting had positive associations with spring beliefs about development. The positive association with class size—also positively associated with the caregiver’s report of self-efficacy—indicates that caregivers with larger class sizes in community-based settings made greater change in their beliefs than those with smaller class sizes.

7. Did WGT support change in PD providers’ beliefs, knowledge, and practice?

From fall 2018 to spring 2019, WGT PD providers agreed more with evidence-based beliefs and knowledge about how to support children’s language development (mean score of 4.7 to 5.0 on a 6-point scale). WGT resources were closely aligned with these beliefs and knowledge. PD providers’ scores decreased slightly on a measure of overall beliefs about child development that did not include WGT

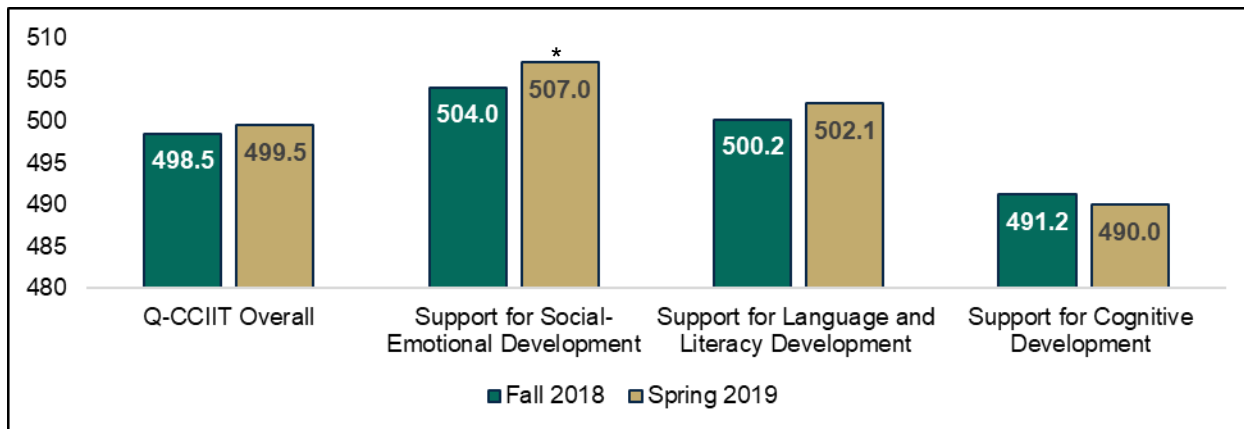
practices (mean score of 5.1 to 5.0).⁷ We did not find significant changes for PD provider measures of beliefs about supporting social-emotional or cognitive development, or their knowledge of child development (such as when children develop specific skills).

PD providers’ reported use of different PD strategies evolved between fall and spring, including increases in reported use of video recordings of caregiver practice (a recommended activity in WGT; mean rating from 2.2 to 3.6 on a 6-point frequency scale). In contrast, there was a decrease in reported use of methods such as discussing in-person classroom observations (mean 4.6 to 4.2) and suggesting or providing trainings for caregivers to attend, neither of which were specific components of WGT (mean 3.9 to 3.5 and 3.6 to 3.1, respectively). From fall to spring, PD providers responded consistently, on average, that PD approaches should be changed if the caregiver’s practice is not improving, and that individual caregivers need different PD approaches.

8. Did WGT support change in caregivers’ observed practice?

From fall to spring, average scores for caregivers participating in WGT improved in the Support for Social-Emotional Development domain of the Q-CCIIT (Exhibit ES.7). This finding aligned with the original hypotheses; support for social-emotional development is a hallmark of all module practices to varying degrees.

Exhibit ES.7. WGT caregivers scored significantly higher in the Social-Emotional Development domain from fall 2018 to spring 2019 (W-score comparison)



Source: WGT Field Test 2019 Q-CCIIT observations.

Note: Mean score for W-scores is 500.

* Indicates a significant difference between fall and spring means (*p < 0.05).

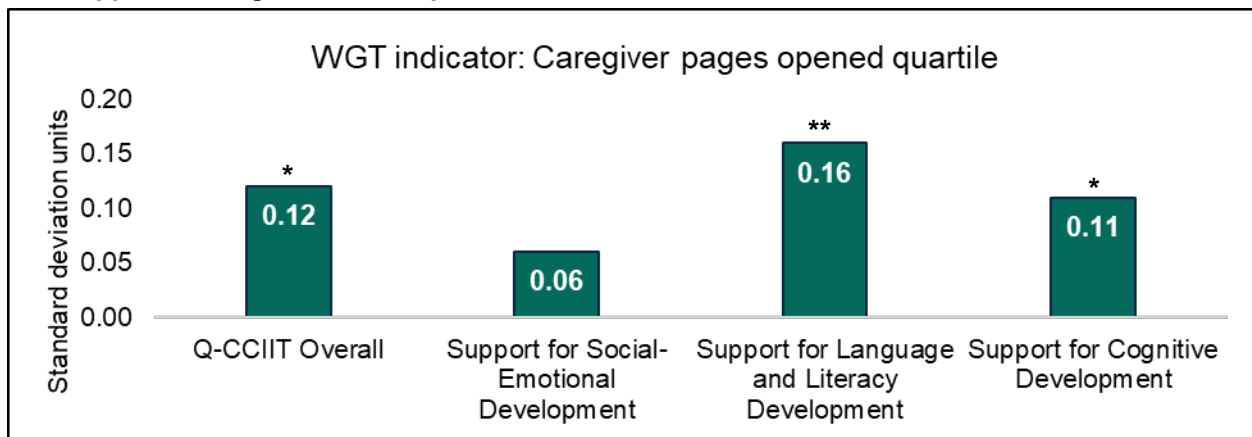
Looking at change in Q-CCIIT scores by subgroup, EHS caregivers demonstrated a significant increase in Q-CCIIT scores in both the Support for Social-Emotional Development and Support for Language and Literacy Development domains (W-score increase from 503.8 to 509.7 and 498.7 to 502.8, respectively). As noted above, more than half of all caregivers (53.7 percent), including EHS caregivers, spent most of their time working in one of the three modules focusing on language and literacy practices.

⁷ This measure addressed knowledge of the capability of even very young infants; how to support positive physical health, such as preventing dental problems; and what child behaviors are indicators of future problems or disabilities.

Our selected dosage indicator of WGT pages opened by the caregiver (by quartile) was significantly related to spring total Q-CCIIT scores. The fall baseline Q-CCIIT score, the caregiver’s years in ECE, and a negative coefficient for the number of weeks between observations and the start of WGT were other significant predictors of total Q-CCIIT scores.

Looking at domain-level Q-CCIIT scores, the WGT dosage indicator was also positively related to the spring Support for Language and Literacy and Support for Cognitive Development domain scores, along with other covariates. However, unlike the other domains and the total score, none of the WGT dosage estimates was significant for the Support for Social-Emotional Development domain score, although the indicator for EHS caregivers was. Caregivers with a bachelor’s degree, smaller group sizes, and better caregiver:child ratios had stronger scores in Support for Social-Emotional Development in the spring, controlling for the fall observation in this domain and for EHS. The bachelor’s degree was a significant covariate only in Support for Social-Emotional Development. This finding suggests that higher education pre-service training may place a stronger emphasis on social-emotional development than on other areas.

Exhibit ES.8. Our selected dosage indicator of WGT pages opened by the caregiver was significantly associated with spring total Q-CCIIT scores and Support for Language and Literacy and Support for Cognitive Development domain scores.



Source: Spring 2019 WGT Caregiver Feedback Survey and Web user tracking data.

Note: Models were estimated with full information maximum likelihood. Covariates include the fall score of the respective outcome, weeks between WGT start and spring observation, caregiver education level, experience in ECE, Kessler-6 scores, whether classroom served toddlers, class/group size, caregiver:child ratio, ECE setting type, caregiver report of contribution to professional effectiveness, PD provider is supervisor, and PD provider dosage. * $p \leq 0.05$; ** $p \leq 0.01$; *** $p \leq 0.001$.

F. Implications of the WGT field test findings

The WGT field test was designed to examine whether a diverse sample of caregivers, working in concert with their local PD providers, could use the WGT intervention to change their beliefs and knowledge of evidence-based practices or improve the quality of their practices with infants and toddlers. The intervention was intentionally designed to take place within “real world” conditions, using local PD providers and sampling from a range of ECE settings serving infants and toddlers across multiple localities.

From the first steps of selection and recruitment, we realized that challenges would arise. At the setting level, contacts often needed to discuss requirements for participation with other decision makers and weigh other PD requirements. For example, EHS settings often needed program-level approval before committing to the study. A number of caregiver-provider pairs expressed concern about having the time to participate in the intervention, given their other responsibilities; some were unable to commit. For caregivers, these demands included managing curriculum and assessment, providing daily care for children from birth through age 3, and engaging in existing PD activities.⁸ For PD providers, their mentoring caseloads often ranged beyond 10 caregivers, and they commonly had supervisory as well as PD responsibilities for these staff.

In fact, time and flexibility were serious challenges. Caregiver-PD provider pairs had difficulty finding time to meet and often spent less time than we had hoped engaging with the materials on the website. Some experienced difficulties engaging with the technology, especially at the outset. However, they persisted, seeking help with access and mastering their iPad tablets to record and share their practice with their mentors. They conferred with their PD provider in selecting one or more modules on which to work, trying out exercises in the classroom, and noting children's progress.

We found differences between caregiver-PD provider pairs working in EHS settings compared to those in community-based settings, which suggests important implications for future research. We found an association of EHS with improved quality in some of the models predicting the overall Q-CCIIT and Support for Social-Emotional domain scores. EHS PD providers may have been more attuned to practice-based coaching approaches because of the program's emphasis on coaching. EHS programs often have smaller class sizes and shorter days relative to community-based providers.

Ultimately, with only four months of exposure (and often less), caregivers on average progressed toward improved self-efficacy and beliefs about practices for supporting the language development of infants and toddlers in their care. They showed improvement in the observed quality of caregiver-child interactions in the Support for Social-Emotional Development domain. As noted above, these findings should not be interpreted as causal because we did not include a comparison group. Caregivers expressed positive feelings about the WGT concepts and activities, the support given by their PD providers, and their ability to reflect on and change their practice. The lessons from this field test will be helpful in enhancing the WGT system and suggesting questions to be explored in further research.

⁸ Anecdotal evidence suggests that WGT did not fulfill the PD requirements that caregivers needed to meet; therefore, participation in the study required work beyond the other PD activities they were required to attend.

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I. Motivation for We Grow Together

A. Introduction to the We Grow Together Professional Development System

1. Overview

The We Grow Together Professional Development System (WGT) aims to improve the quality of caregiving in early childhood settings by helping infant-toddler caregivers understand how their interactions with young children support child development. The system includes training, strategies, and materials aligned with the principles and practices of the Quality of Caregiver-Child Interactions for Infant and Toddlers (Q-CCIIT) observational measure. Local professional development (PD) providers⁹ support caregivers as they implement practices intended to promote infant and toddler social-emotional, cognitive, and language and literacy development. The system is designed for use in center-based classrooms and family child care homes (FCCs).¹⁰

Mathematica and its partners developed WGT as part of a project funded in 2015 by the Office of Planning, Research and Evaluation (OPRE) in the Administration for Children and Families (ACF), U.S. Department of Health and Human Services, entitled Professional Development Tools to Improve the Quality of Infant and Toddler Care. The project was designed to support ACF’s vision for helping early care and education (ECE) programs and staff deliver quality services that promote positive outcomes for young children.

This chapter provides an overview of WGT, including background on the purpose and development of the Q-CCIIT measure; the WGT conceptual framework; and a summary of the modules, tools, and supportive materials the WGT system provides. Chapter II includes an introduction to the study’s research questions and a summary of the field test and data collection activities. Chapter III introduces the plan for data analysis, and Chapter IV presents the findings, grouped by research question. Chapter V summarizes highlights of the study findings, implications for future adaptations to WGT, and considerations for future research. Appendices in a separate volume include a glossary and additional data tables and details about psychometric and sensitivity analyses and the implementation study.

2. WGT literature review highlights to shape the WGT project

In 2016, we conducted a review of the literature for this project (Aikens et al. 2016) to summarize the state of the field, highlighting the most promising methods and approaches for enhancing caregiver interactions with young children. The review focused particularly on caregivers serving infants and toddlers, those with limited education, and those in home-based and family child care (FCC) settings.

The literature review noted the emergence of several key findings related to the overall development of PD strategies—and the tools for implementing those strategies—particularly germane to this project.

⁹ Throughout, we refer to “caregivers” as representing nonparental caregivers and teachers in Early Head Start, community-based child care centers, and family child care (FCC) homes. Throughout, we refer to “PD providers” as representing a range of ECE staff who provide professional development, both within programs and employed by outside entities, such as managers and education directors, supervisors, mentors, coaches, employees of technical assistance (TA) networks or centers, and master teachers in the ECE setting.

¹⁰ Throughout, we refer to “classrooms” as representing both center-based and FCC settings.

These key findings are as follows:

- **The early childhood workforce is diverse.** Experience, knowledge, perceptions, and beliefs are all likely to influence an individual caregiver’s ability to engage in and benefit from different types of PD (Weber-Mayrer et al. 2015).
- **Effective coaching or mentoring** covers a variety of strategies: the development of positive caregiver-PD provider relationships, collaborative progress monitoring (including self-assessment), live or video modeling, practice opportunities, and performance-based feedback (Barton et al. 2011; Casey and McWilliam 2011).
- **Coaching is most effective when it is sustained,** actively engages caregivers, and emphasizes positive and respectful coach-caregiver relationships (Artman-Meeker et al. 2015; Dunst et al. 2015; IOM and NRC 2015; Mattera et al. 2013; U.S. Department of Education 2010). The development of positive provider-caregiver relationships is critical to PD efforts (Aikens and Akers 2011; Artman-Meeker et al. 2015).
- **Performance feedback** is a key means for supporting caregiver outcomes—particularly positive, constructive, specific, and immediate feedback (Brown and Inglis 2013; Ottley and Hanline 2014; Abell et al. 2014).
- **Active-learner strategies**—particularly practicing, evaluating strengths/weaknesses and experiences, reflecting on performance, and self-assessment—are strongly associated with caregiver outcomes (Dunst and Trivette 2009; Trivette et al. 2012).
- When the literacy demands for PD materials are high and concepts are abstract, **providing a clear translation of PD materials to classroom practice is critical** (Neuman and Wright 2010). This approach may be particularly helpful for caregivers with limited education or literacy levels.
- **Setting measurable and attainable goals** is a critical component in developing a plan for quality improvement. Goals should be actionable and shared between PD provider and caregiver (Aikens and Akers 2011; Artman-Meeker et al. 2015; Morris et al. 2013; Paulsell et al. 2006; Powell et al. 2010).
- **Technology can be a useful tool** for accessing and delivering PD, **particularly for caregivers located in remote or isolated areas** (Krick Oborn and Johnson 2015). The technology most commonly discussed in the literature is the use of video to record caregiver practice—a particularly supportive tool for coaching and providing performance feedback (Fukkink and Lont 2007; Guss et al. 2013; IOM and NRC 2015; Trivette et al. 2012; Weinstock et al. 2012; U.S. Department of Education 2010).
- **Technical support**, including an initial orientation to technology and ongoing logistical support, is an important consideration for any online approach (Chen et al. 2009; Hollingsworth and Lim 2015; Kyzar et al. 2014).
- **Online technologies** offer an opportunity to provide collegial support for caregivers who are geographically or socially isolated (Chen et al. 2009).
- Caregivers using online tools for PD appreciate **supplementing online content and activities with in-person contact**, including with others in their local program (Chen et al. 2009; Kyzar et al. 2014).

These literature review findings informed the development of the project’s conceptual frameworks, the suite of WGT tools, and the approach to the field test.

B. The WGT conceptual framework

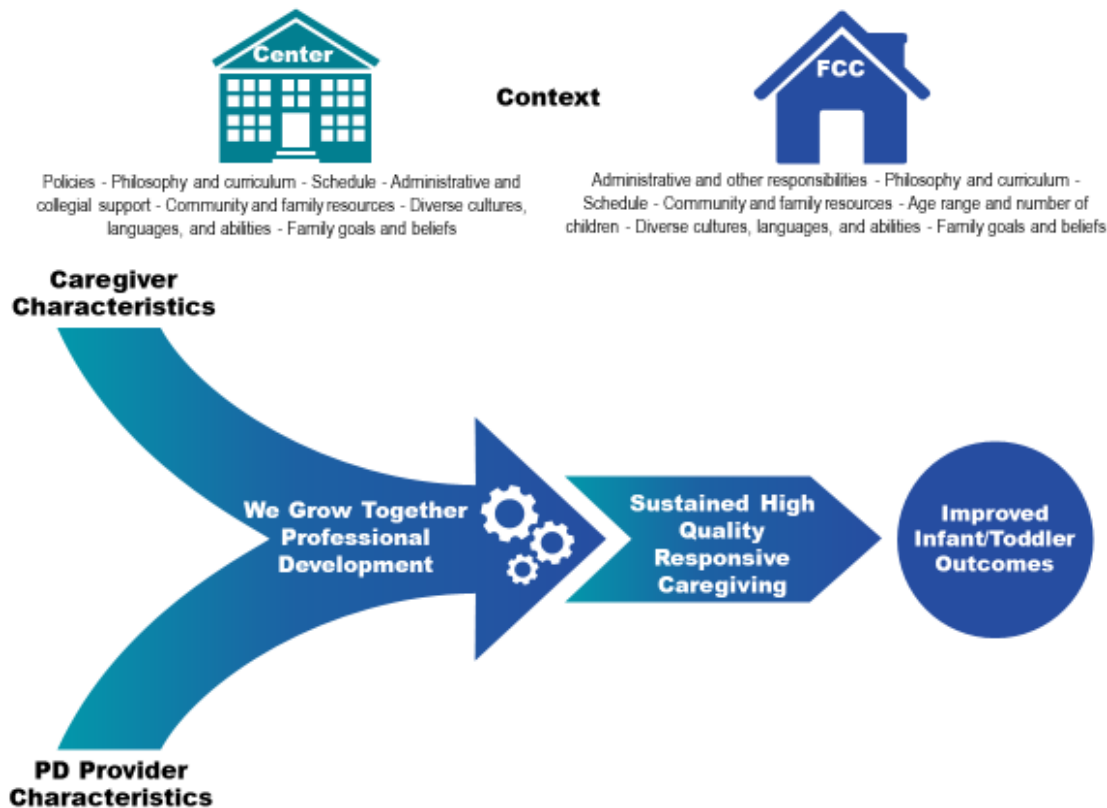
Drawing on the evidence base in the literature review and the principles of high quality caregiving reflected in the Q-CCIIT measure (in other words, support for the social-emotional, language and literacy,

and cognitive development of infants and toddlers), the team developed a conceptual framework to guide WGT. The principles delineated here reflect the theoretical approach rather than the specifics of the system tested in the field text.

The WGT conceptual framework recognizes how characteristics of the PD provider, the caregiver, and the caregiver’s setting help to shape the implementation and success of PD. The framework also assumes that the PD process takes place within a trusting provider-caregiver relationship. Grounded in research, the framework includes recognition of the “who” (infant-toddler caregivers from diverse settings), “what” (the Q-CCIIT measure’s caregiving principles and practices), and “how” (the process of changing practice) of the WGT professional development process.

As Exhibit I.1 notes, the overall framework illustrates how caregiver and PD provider characteristics interact in the WGT PD process. This process, grounded in the Q-CCIIT measure’s principles, is designed to result in high quality, responsive caregiving, and ultimately improved child outcomes. In Exhibit I.1, we also include the context in which the caregiver operates, recognizing that some settings may involve opportunities or constraints that affect how PD efforts are implemented and supported in the work setting. The overall WGT PD process is adaptable to a variety of caregivers and care settings, including center-based and FCC settings.

Exhibit I.1. WGT professional development conceptual framework



1. PD context in the conceptual framework

As Exhibit I.1 indicates, context matters for early childhood caregivers. Both center-based care settings and FCCs are governed by policies, philosophies, and curricula that may constrain an individual caregiver's ability to implement new practices. For example, settings may vary in the ratio of adults to children, whether a primary caregiver is assigned to each child, and the continuity of care for children. Settings also vary in their schedules, resources, and administrative and collegial support for innovation or improvement. Resources include community and family resources related to families' and caregivers' ability to support children's positive development.

FCC settings differ from center-based settings in many ways, and FCC caregivers face unique challenges. They are likely to have additional responsibilities outside of the classroom (for example, administrative tasks, food preparation) and to work independently and in settings with a wider age range. Home-based caregivers tend to work longer hours than center-based caregivers (as many as 54 hours per week; NSECE 2013). They may be part of formal or informal networks that provide training and technical assistance (TA), or they may be isolated. At the same time, depending on their funding sources, home-based caregivers may operate with more or fewer constraints, as dictated by institutional policies. WGT is designed to help PD providers tailor their coaching to the demands of different settings.

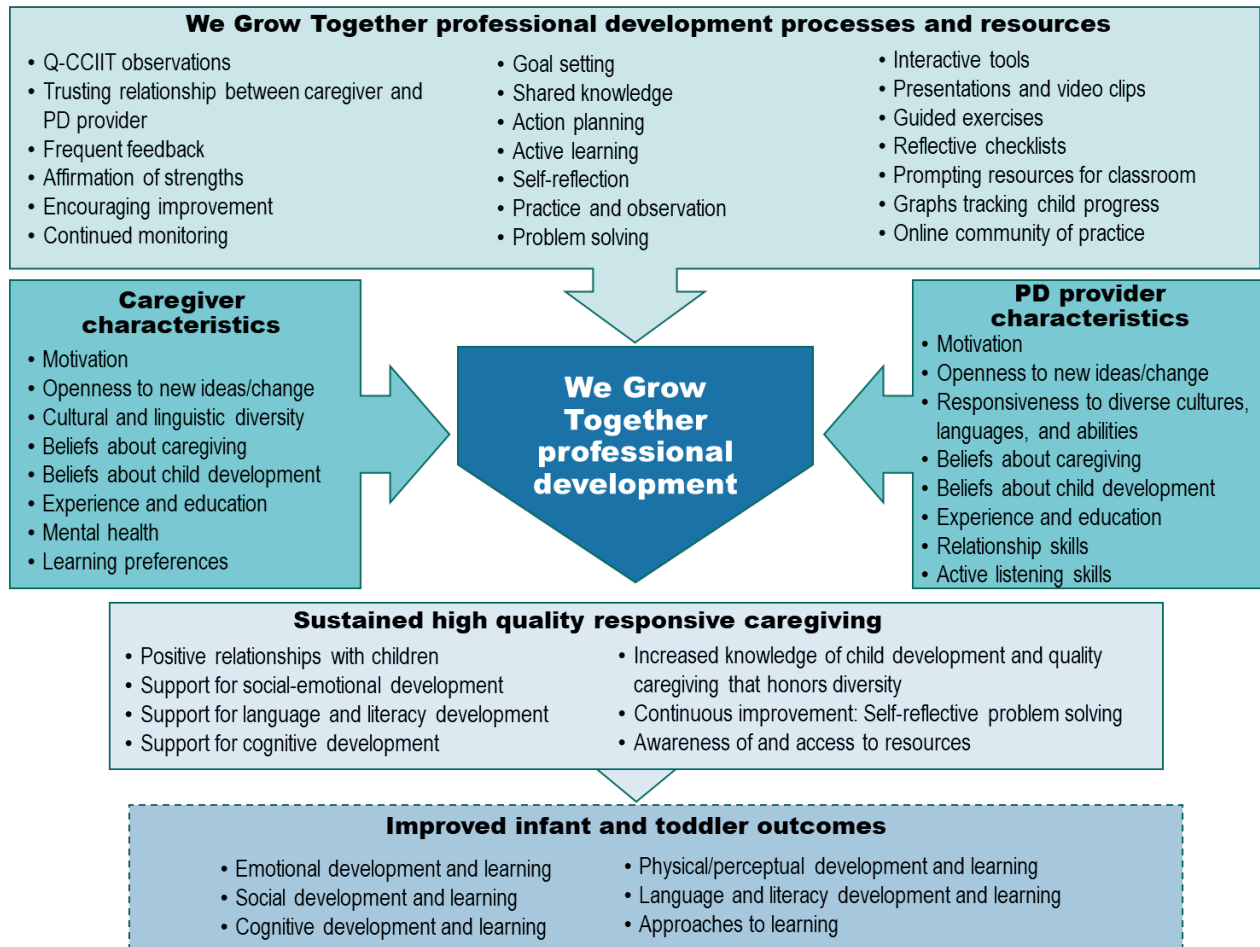
2. Caregiver and PD provider characteristics in the conceptual framework

In Exhibit I.2, we emphasize the importance of characteristics of both the caregiver and PD provider when considering PD. Caregivers' motivations, knowledge, and beliefs about child development and caregiving; education and experience; mental health; and willingness to adopt new practices all influence their receptiveness to learning new skills (Domitrovich et al. 2009; Downer et al. 2009). Even when receptive, caregivers differ in their preferred methods of learning. For example, some prefer that the PD provider show them a practice, whereas others want to read about the practice and then try it out on their own before having the PD provider observe (Drago-Severson and Blum-DeStefano 2017). Following this guidance, we designed WGT to accommodate a variety of learners.

Change may be especially difficult for caregivers working with infants and toddlers. Research suggests that many infant and toddler caregivers are influenced by the ways in which their family of origin or culture provided care to infants, or by their own attachment style or stance toward intimacy (Biringen et al. 2012; Moreno et al. 2015). Learning new styles of interaction involves considerable thought and energy. We considered ways to motivate caregivers (for example, explaining why each practice is recommended; encouraging caregivers to notice and track changes in the children in their care as they implement new practices; providing behavioral nudges to continue implementation).

Infant and toddler caregivers often face educational and wage barriers. Low levels of educational attainment and low wages are common among caregivers of the youngest children—even lower than among preschool caregivers and teachers (Whitebook et al. 2014). These factors may affect a caregiver's ability to access and benefit from PD. At the same time, these factors may influence how much the caregiver believes that the implementation of high quality practices is achievable (IOM and NRC 2015). The WGT team developed a training plan for PD providers, recommending a combination of online materials and in-person support to accommodate caregivers with a range of backgrounds and needs.

Exhibit I.2. WGT professional development logic model: participant characteristics and outcomes



3. Expected outcomes of the WGT PD process in the conceptual framework

As the WGT logic model in Exhibit I.2 shows, successful implementation of the WGT PD process should result in caregivers’ being able to demonstrate sustained, high quality and responsive caregiving, characterized by positive relationships with children, increased knowledge of child development and quality caregiving, support for children’s development across domains, and continuous improvement in quality supported by self-reflective problem solving and awareness of and access to resources. However, the field test design did not test a causal relationship between WGT and caregiver outcomes.

This sustained, high quality and responsive caregiving should also result in more positive outcomes for infants and toddlers, especially in social and emotional, language and literacy, cognitive, and physical/perceptual development, and approaches to learning. However, the WGT field test did not collect data on child outcomes. Future studies may enable us to explore the effects of caregiver participation in WGT on children.

C. Creating the We Grow Together System

1. Designing WGT PD tools for caregivers and PD providers

a. *Background on Q-CCIIT measure purpose and development*

In this section, we describe the background of the Q-CCIIT measure that informed the materials tested in the spring 2019 WGT field test. The Q-CCIIT observation tool measures the quality of child care settings serving infants and toddlers, including center-based care and FCC, single-age classrooms, and mixed-age settings. The Q-CCIIT offers early childhood professionals and researchers a tool to better understand how caregivers and young children interact in child care settings and improve child care services for infants and toddlers in the future. The Q-CCIIT measures caregiver support for social-emotional, cognitive, and language and literacy development, as well as areas of concern. Specifically, the Q-CCIIT requires observation of 10-minute time samples¹¹ over a minimum of two hours. The Q-CCIIT enables observers to code some dimensions within each 10-minute sample (a cycle) while coding other dimensions that consider the entire observation period. Observers rate the caregiver based on the average experience provided to the children in each cycle.

In the original Q-CCIIT project, funded by OPRE/ACF, we used a four-phase approach to develop, operationalize, and refine the Q-CCIIT measure and collect data on its psychometric properties: an initial phase, comprising a literature review and the development of a measurement framework, and three data collection phases. With each phase, we refined the measure until we ultimately evaluated the psychometric properties of the final measure during a psychometric field test. The final field test sample included 400 classrooms (110 FCCs and 290 center-based classrooms) in 10 geographical clusters spanning 14 states and the District of Columbia. These field test analyses provided psychometric evidence supporting the strong reliability and validity of the Q-CCIIT as a measure of caregiving quality (Atkins-Burnett et al. 2015).

The Q-CCIIT measure's strong reliability, sensitivity to variation in caregiving, and evidence of validity support its ability to provide estimates of quality across and within caregivers and suggest its utility for potential uses with professional development, evaluation, and research. The Q-CCIIT offers the opportunity to identify strengths and challenges in caregiving in a variety of settings, and the potential to test different approaches for improving caregiving for children. As we describe below, the Q-CCIIT, when used by independent, trained observers in the WGT field test, provided an initial measure of caregivers' strengths and areas for growth. This information helped to shape selection of WGT modules for caregivers to work on, with the guidance of PD providers. Through fall and spring scores on the total Q-CCIIT and its domains, the measure also provided both the pre- and post-intervention picture of the quality of caregivers' interaction with the infants and toddlers in their care.

b. *Overview of the WGT PD modules*


For the field test of WGT, conducted during fall 2018 to spring 2019, a Q-CCIIT observation at baseline informed the selection of areas for growth in the caregiver's practices. Then, PD providers and caregivers could select from an array of PD tools based on constructs and competencies in the Q-CCIIT measure. We organized these tools into nine web-based modules, or sections, designed to support infants' and toddlers' (1) language and literacy development, (2) social and emotional development, and (3) cognitive

¹¹ In the psychometric field test, we observed six 10-minute time samples in each classroom and FCC.

development. These modules were further divided into key practices that enabled caregivers to explore skills and exercise new caregiving techniques. Within the key practices, we arranged PD tools in a consistent pattern. We outlined the modules corresponding to each of the three key areas in Exhibit I.3.

Exhibit I.3. WGT PD modules






MODULE		OBJECTIVES
		Caregivers will learn and implement best practices such as:
	Support Social-Emotional Development: Caregiver-Child Relationships	<ul style="list-style-type: none"> • Responding to children’s social cues • Responding to children’s emotional cues • Responding to children in distress • Building a positive relationship • Supervising and joining in play and activities
	Support Children’s Language Use	<ul style="list-style-type: none"> • Responding to children’s cues • Taking turns in conversation • Asking questions • Extending children’s language use • Supporting children’s use of new words
	Support Children’s Understanding of Language	<ul style="list-style-type: none"> • Using different types of talk • Using lots of specific and new words • Supporting learning about concepts • Engaging children in books • Using themes and projects
	Support Social-Emotional Development: Regulation of Behavior and Emotions	<ul style="list-style-type: none"> • Using responsive routines • Managing behavior and setting limits • Responding to emotional cues • Supporting self-regulation
	Support Social-Emotional Development: Support Non-Mobile Infants’ Peer Interactions	<ul style="list-style-type: none"> • Supporting peer interaction and play • Creating a sense of belonging • Supervising and joining in play and activities
	Support Social-Emotional Development: Support Toddlers’ Peer Interactions	<ul style="list-style-type: none"> • Supporting peer interaction and play • Extending pretend play • Supporting social problem solving • Creating a sense of belonging
	Support Literacy	<ul style="list-style-type: none"> • Engaging children in books • Encouraging a positive attitude toward books • Using new words and sentences • Making connections to things not present
	Support Infants’ Cognitive Development	<ul style="list-style-type: none"> • Supporting object exploration • Supporting children in making choices • Supporting learning about concepts • Extending knowledge about the world



MODULE	OBJECTIVES
 <p>Support Toddlers' Cognitive Development</p>	<p>Caregivers will learn and implement best practices such as:</p> <ul style="list-style-type: none"> Scaffolding problem solving Supporting children in making choices Extending pretend play Extending knowledge about the world

c. *Types of WGT PD tools for caregivers*

To accommodate diversity in learning preferences, WGT provided varied WGT PD tools (outlined in Exhibit I.4). Videos, handouts, and presentations introduced and demonstrated each key practice to provide shared understanding of WGT foundational principles and practices. Handouts were available to share with colleagues/supervisors and families to ensure that the entire caregiving team was involved in supporting and using the key practice. Checklists and self-reflection questions on the WGT website offered support for collaborative progress monitoring, self-reflections, and feedback. Using surveys and web analytics, we collected information about the characteristics, background, knowledge, beliefs, and user experiences of the caregivers and PD providers who participated in the field test.

Exhibit I.4. Types of WGT PD tools for caregivers

	<p>Brief presentations—These narrated presentations introduced the key practices that caregivers could use with infants and toddlers to support their use of language. An introductory presentation briefly reviewed the overall topic and described the key practices in the module. Each key practice had its own presentation on what it was and why, when, and how to use it, along with some examples. Some presentations had a link to short videos. Each presentation also included an activity that asked caregivers to think about how to use a practice and recommended that the caregiver discuss the activity with their PD provider. The presentations were designed to guide caregivers in selecting goals.</p>
	<p>Handouts—One- to two-page handouts, including the what, why, and how of each key practice, provided a summary to share with colleagues or families to help the entire caregiving team work together.</p>
	<p>Step-by-step guides and checklists—Caregivers could use these guides and checklists to keep track of how they were using a new practice or changing a practice. We recommended that the PD provider and caregiver look through these guides and checklists together and create an action plan for when and how to implement this practice with the children.</p>
	<p>Brief videos of caregivers implementing practices—Our video library of caregivers demonstrating practices encouraged them to think about how other caregivers implement those practices and how to apply the strategies to their own practice.</p>
	<p>Activities and self-reflection exercises—These exercises encouraged caregivers to think about the key practices and ways they might change or improve their own practice. Some of these activities involved self-recording with a project-provided iPad mini.</p>

	<p>Classroom supports—These supports included handouts, posters, and key rings; they provided ongoing reminders of new practices that the caregiving team could look at throughout the day to enhance interactions with the children.</p>
	<p>Progress charts—These chart templates helped caregivers track children's progress.</p>

Together, the PD provider and caregiver set goals for the PD process. These goals then directed an active change phase, during which the caregiver and PD provider used tools from the website to develop an action plan and implement new practices. Through PD training, PD providers learned how to develop SMART (specific, measurable, attainable, relevant, and timely) goals and action plans. We encouraged the PD provider to recommend specific resources based on the caregiver's skills, goals, and learning preferences. PD providers could also point the caregiver to supplementary WGT resources, including questions to ask (available on key rings), posters of descriptive vocabulary and concepts, and other classroom supports that helped to facilitate the application of new skills. The level of intensity and duration needed to learn a key practice varied with the complexity of that practice and characteristics of the setting and caregiver (for example, the caregiver's motivation and background experience).

d. Developing a web-based delivery system

We designed the WGT website in a customizable Learning Management System. This platform allowed for individualization of content, nesting of content, data collection via periodic questions about use of resources, tracking use, and discussion boards. The online component also gave the caregiver and PD provider access to WGT tools regardless of geographic location. We designed the website so that a PD provider would have access to all caregiver PD tools, as well as additional PD provider tools. The study team used the Q-CCIIT measure scores to point the caregiver to PD modules on the caregiver's individualized home page. Following a goal-setting process with the trained PD provider, the caregiver selected key practices as goals within each module. Within each key practice, we highlighted specific tools as "recommended" for all caregivers, whereas others were supplemental. Caregivers worked with their PD providers to further select tools that supported their learning.

2. Training and implementation supports for PD providers

a. Role of the PD provider in the WGT system

In the field test, each caregiver worked with a PD provider trained to guide the caregiver in using the tools and evidence-based professional development strategies. The WGT system encouraged caregivers and PD providers to use information about the caregiver's practice; collaboratively select specific and attainable goals; and support implementation with behavioral nudges, positive comments, and constructive feedback. To support and encourage caregiver motivation, the PD process built foundational knowledge, drawing on multimedia resources and encompassing active learning (for example, trying out skills, problem solving ways to implement practices effectively, and focusing on the effect of practice on children's interactions and skills). Throughout the PD process, tools on the WGT website supported caregivers and PD providers by offering information about implementation of strategies and the types of changes caregivers should expect to see in children. Multimedia resources included video models illustrating good practice, guides for conducting role plays, and links to additional resources. In addition,

PD providers could help the caregivers reflect on self-recorded practice videos, providing feedback that affirmed strengths and progress while encouraging improvement and problem solving.

The WGT team recognized the need to train PD providers to foster caregivers' self-efficacy. PD providers entered the relationship with their own set of characteristics and potential challenges that might have differed from those of caregivers. PD providers might not be familiar with processes of adult learning and therefore might need assistance in self-awareness and how best to support other learners (IOM and NRC 2015). Moreover, a PD provider's cultural background, education, and experience in ECE represented not only the background knowledge the PD provider brought to the process but also could affect how a caregiver viewed that PD provider.

PD providers can be most effective in supporting the caregivers' growth if they have strong relationship skills and understand how to think about, reflect on, and improve relationships among caregivers, children, and families (Abell et al. 2014). Caregivers vary in their cultural, linguistic, and individual responsiveness to families and children. Therefore, PD providers needed to help caregivers understand the beliefs underlying family practices as well as the WGT practices (Lynch and Hanson 2011). With this combined understanding, the caregiver could communicate about strategies to families in ways that would enhance collaboration and support from those families for the caregiver's efforts (USDOE 2010).

In sum, PD providers are likely to require guidance in how to frame PD in ways that support adoption of high quality practices; promote responsiveness to children's diverse cultures, languages, and abilities; and honor caregivers' knowledge and experience. Therefore, PD provider training was a crucial aspect of ensuring the success of the WGT system.

b. Training PD providers on the WGT system

Before the field test implementation period, PD providers attended an online training designed to orient them to the WGT system. The training focused on increasing their understanding of the WGT key practices, awareness and understanding of adult learning and ways of knowing, learning preferences, and coaching/mentoring strategies. The PD training encouraged an ongoing relationship-based approach to PD.

The training focused on the following topics and WGT key practices:

- Establishing a trusting and respectful relationship with the caregiver(s)
- An overview of caregiving principles and importance of responsive relationships
- Caregiving practices that promote infant and toddler social-emotional development
- Caregiving practices that promote language and literacy development
- Caregiving practices that promote cognitive development
- Caregiving practices that facilitate classroom management; and areas of concern in an infant or toddler classroom
- Using information from the WGT principles to set goals and develop action plans collaboratively with caregivers
- Techniques for using the WGT tools

In training, we encouraged PD providers to start with small steps and build on caregivers' successes in learning a practice. We suggested skills to help PD providers support caregivers in maintaining key

practices and making them a habit. Training included information about establishing new habits and using behavioral nudges.

With the goal of providing substantive knowledge support¹² through the PD providers, support for PD providers continued into the implementation period of WGT. We invited PD providers to attend a series of three implementation webinars and office hours at varied times. These sessions were meant to keep PD providers engaged in the process, clarify misconceptions, and help address challenges.

The PD provider tools included learning activities to support caregivers and resources to help them strengthen or establish the basis for a trusting, respectful relationship with the caregivers while sharing WGT best practices. The tools included the following:

- The **action plan template** helped caregivers intentionally plan how to implement specific key practices in the classroom in a given week.
- **SMART goals** that are specific, measurable, and attainable for caregivers. The relevance and timeliness depend on the caregiver.
- **The process of changing habits** outlined steps for changing caregiver habits and how PD providers could support the caregiver at each step.
- The **getting to know you** resource was a description of some of the ways to start a relationship and get to know caregivers better.
- Caregivers completed the **caregiver learning preferences survey**. PD providers used the results to learn more about how each caregiver preferred to learn.
- **Coaching session guidelines** presented recommendations for coaching sessions and a sample of a coaching routine to help PD providers work effectively with caregivers.
- The **words and phrases to pair with positive comments** handout included words and phrases to use in positive comments so that PD providers could vary the words they used (and also model varied words for the caregivers).
- The **coaching practice recommendations table** described coaching strategies PD providers should try and things to avoid when working with caregivers to improve their practice.
- The **cultural awareness handout** offered activities and resources to increase PD providers' and caregivers' awareness of how culture influences actions and interactions.
- **The role play handout** provided the rationale for using role play and its benefits in comparison to modeling. This handout could be shared with administrators or used for talking points in discussions with caregivers who asked for modeling.
- A **list of mindfulness resources** shared information on mindfulness and meditation resources available on the Internet at no cost.
- The **coaching resources** provided links to resources about effective coaching practices. These resources were free or low cost; most were available on the Internet.

¹² “Substantive knowledge” refers to understanding the practices and how to implement them regularly, and how to use the WGT PD process to motivate caregivers; select SMART goals; and encourage active learning, reflection, maintenance of prior goals, and continuous learning.

3. Iterative development through pre-tests

These WGT tools and resources grew through iterative development across two waves of pre-tests. A pre-test of the content of the PD tools took place in spring/summer 2017. The first pre-test focused on the content, language, and written format of the PD tools and provided the materials in hard copy. Its goal was to refine the PD tools and explore how to best support caregivers and PD providers in understanding and implementing high quality practices. This information informed revisions to the PD tools and our approach, as well as development of the WGT PD website. One result was the decision to limit recommended modules and tools to avoid overwhelming caregivers with information.

A second pre-test from January through April 2018 examined the accessibility of the revised WGT PD tools on the website. The primary goal was to gather feedback on the PD tools within the website under realistic implementation conditions. This user testing of the website enabled us to gather feedback on the revised content and use of the tools over a longer period of implementation than for the first pre-test. Additional goals included testing our background and feedback surveys with samples of nine caregivers and PD providers, and pre-testing a draft of our PD provider training.

We incorporated feedback from pre-test caregivers and PD providers. For example, we addressed scheduling challenges at centers/FCCs by holding more frequent, shorter meetings. Based on feedback from primarily Spanish-speaking caregivers, in recruiting for the field test, we emphasized the importance of being comfortable with both reading materials and watching videos in English. We revised the study graphic distributed during the pre-test so it could be distributed to center directors during recruitment to involve them in supporting the process from the beginning. We also suggested that PD providers and caregivers share with colleagues those handouts that were part of each WGT module. This approach helped provide center directors with insight into what the participating caregiver was working on. In Chapter II, we provide details on the full-scale field test of WGT.

II. Field test design

The purpose of the field test was to examine implementation of WGT and understand whether early childhood professionals could use it to support caregivers' interactions with infants and toddlers. In the field test, we used varied analytic methods to examine change on a variety of outcomes from baseline to follow-up for a purposive sample of pairs of caregivers and local PD providers. Ultimately, findings provide the basis for suggested refinements of WGT and the PD approach.

A. Research questions

After careful, iterative development of the WGT resources and system, the field test was designed to implement and examine them in real world settings. We expected that with access to resources and PD support for children's social-emotional, cognitive, and language and literacy development, caregivers would demonstrate continuous improvement in quality. Specifically, we expected that use of the WGT system would promote sustained, high quality, responsive caregiving; increased knowledge of child development and quality caregiving; and support for children's development. Exhibit II.1 lists the specific research questions that were the focus of the field test.

Exhibit II.1. WGT research questions

Research questions (RQs)

1a. Who are the participants in the WGT field test?

1b. What tools and support help early childhood professionals to use the responsive caregiving principles covered by WGT to improve caregiver-child interactions?

- a. How frequently do caregivers and PD providers make use of WGT over the implementation period, and which tools did they access?
 - b. How do caregivers and PD providers engage with the technological components of WGT (that is, usability of the website, accessing the website and tools within it, using the tablets)?
 - c. Are participants satisfied with WGT (both the content and tool types, such as the narrated presentations, summary handouts, and step-by-step guides)?
 - d. Are participants satisfied with the PD process (goal setting, action planning, practice and observation, reflection, feedback, trusting relationship)?
 - e. What are the challenges and barriers to WGT implementation in infant/toddler settings?
 - f. Do answers to these questions differ by subgroups (caregivers and PD providers associated with FCCs versus center-based settings or EHS versus community-based settings) or characteristics of caregivers and providers? (See Table III.1 for more information.)
-

Research questions (RQs)

2. Can WGT be used by early childhood professionals to support change in beliefs, knowledge, or practice concerning infants and toddlers?

- a. Is four months' implementation of WGT associated with change in the quality of caregiver-child interactions as measured by Q-CCIIT instrument scores (fall to spring)?
 - b. Is four months' implementation of WGT associated with change in caregivers' and PD providers' beliefs and knowledge about child development and caregiving or change in caregivers' self-efficacy as teachers (fall to spring)?
 - c. Does the PD provider perceive change in the PD provider's own practice after PD providers' training and four months' implementation of WGT?
 - d. Does the caregiver perceive change in the caregiver's own practice after four months' implementation of Q-CCIIT PD tools?
 - e. Do answers to these questions differ by subgroups (caregivers and PD providers associated with FCCs versus center-based settings) or characteristics of caregivers and providers? (See Table III.1 for more information.)
-

B. Site selection and recruitment

Our goal was to recruit 300 pairs of caregivers and their local PD providers to participate in the WGT intervention. We targeted 10 geographic areas that included EHS, community-based centers, and FCC settings serving infants and toddlers. To select our geographic areas, we considered states that experts had recommended, using key criteria.

They included the following:

- States with PD registries
- States with PD requirements or standards for PD providers or coaches
- States with PD requirements for caregivers (for example, required minimum number of hours)
- States with infant/toddler or mental health specialists¹³

Once recruitment began, to help meet our recruitment goals, we included additional states in which we had prior connections to settings (for example, from the previous Q-CCIIT psychometric field test).

In addition, to gauge the extent of a state's focus on PD for early childhood caregivers and teachers, we considered whether it has established early childhood caregiver competencies. We looked for states requiring 10 or more hours per year of PD for infant/toddler caregivers. Finally, we checked to make sure that PD was not limited to specific programs or curricula the state had already endorsed. These selection criteria were meant to increase our likelihood of finding caregivers and PD providers willing to participate in the WGT study.

We aimed to recruit 175 center-based caregivers (half of them caregivers for infants and half for toddlers) and 125 FCC providers.¹⁴ We trained recruiters in July 2018 and continued recruiting through November 2018.

¹³ Family child care homes in some states receive their technical assistance or PD from mental health specialists.

¹⁴ To arrive at the target sample sizes, we conducted analyses for the minimum detectable effect (MDE)—the minimum detectable significant difference for fixed power and sample size, given in standard deviation-sized units.

1. Recruitment team

We trained and supported a team of 13 recruiters to contact gatekeepers (for example, setting directors) and potential participants. The recruiters sent out recruitment materials and followed up with recruitment calls. Recruiters made individual calls to setting directors, PD providers, and caregivers to share information about the study and request consent.

2. Recruitment approach

During the recruitment period, our approach was to contact either the setting director or PD provider. After gaining agreement with a setting that its staff could participate and recruiting the PD provider, we attempted to recruit the caregiver. We expected the PD provider to be instrumental in helping us recruit the caregiver but were flexible in our approach—sometimes we recruited the caregiver before the PD provider.

Obtaining agreement from all three necessary entities—the setting director, the PD provider, and the caregiver—proved challenging in some instances. Moreover, we were sometimes required to get higher-level network agreement as well.

We prepared a variety of materials for informing program directors, center directors, FCC owners, PD providers, and caregivers about the study. These materials included a project brochure, a project flyer, a participation benefits flyer, an overview document about WGT, an advance letter from the team, an ACF endorsement letter, a letter of support from the Office of Head Start, a fact sheet, and a brief video about WGT.¹⁵

The team also used the informational materials to introduce the benefits of participating in WGT. PD providers received a \$100 gift card for attending training and an additional \$50 gift card for completing intervention activities. Caregivers were provided an iPad mini tablet for use during the intervention, which they could keep so they could continue their learning after the field test ended. Caregivers also received a \$50 gift card for completing intervention activities. Caregivers and PD providers both received certificates to indicate they had participated in WGT and had provided feedback to help with its development.

Our original goal was to recruit caregivers who already had existing local PD providers.¹⁶ Throughout recruitment, we asked setting staff whether caregivers already worked regularly with their PD providers. We quickly learned that many caregivers did not yet have formal established relationships with PD providers. If they did not already work with PD providers, we attempted to accommodate the situations we encountered. For example, setting directors sometimes agreed to serve as PD providers when no established PD provider/caregiver pairs existed within a setting. We did not match PD providers and caregivers together. Instead, staff in the settings created the PD provider-caregiver pairings. We asked

The MDE between the fall and spring Q-CCIIT scores would be 0.24 standard deviations for a sample of 175 classrooms and 0.26 standard deviations for a sample of 125 FCCs. The MDE between 175 classrooms and 125 FCCs in the fall or spring would be 0.38 standard deviations.

¹⁵ Video: <https://vimeo.com/273559198>.

¹⁶ Chapter IV provides more detailed information on caregiver/PD provider relationships for pairs that participated in the field test.

what proportion of the time caregivers used English, Spanish, or another language in their classrooms. We also required that caregivers and PD providers be comfortable using written materials in English.¹⁷

In consultation with ACF, we modified our original plans for reaching our recruitment target in the following ways:

- We were flexible in our targets for setting and classroom types. For example, we ultimately recruited fewer FCC providers than originally planned.
- We extended the recruitment timeline. More than half of our recruited pairs came in during the last few weeks of our extended recruitment period.
- We allowed settings to determine pairs of caregivers and PD providers when caregivers did not already have established relationships. Although this situation occurred in both center-based and FCC settings, it was especially likely to occur in the latter.
- We recruited more than 300 pairs to account for attrition.

We collected electronic consent for participation in WGT through a Confrimit web survey. We sent potential PD providers and caregivers unique links to an electronic consent form and emailed participants who completed the form a copy for their records. We collected some consent forms on paper in the field during fall observation visits; we found it was easier to obtain electronic consent from PD providers than caregivers.¹⁸

C. Selection of the field test sample

By fall 2018, we recruited a purposive sample of 310 pairs comprising 310 caregivers and 187 PD providers. Due to attrition, we used a set of minimum participation criteria to define the final analytic sample. Participants were required to have completed a background survey and, for PD providers, to have logged onto the website or attended at least one training webinar. As described below, they also were required still to be in the study as of March 1, 2019.

1. Attrition

Attrition occurred throughout data collection activities. As a result, our total sample size was different for various data collection activities, depending on how many PD providers and caregivers remained in the WGT program at any given time. Ninety-five people who had consented (73 caregivers and 22 PD providers) left the WGT study during any point in time. Of those caregivers, 13 left the study before participating in any intervention activities and before we collected any data. Others left early enough in the implementation phase (before January 15, 2019) that we were able to replace them in the sample. Ultimately, 39 consented caregivers left the study within eight weeks of implementation (before March 1, 2019).¹⁹ Based on prior PD studies, we set eight weeks as the minimum time needed to consider that they

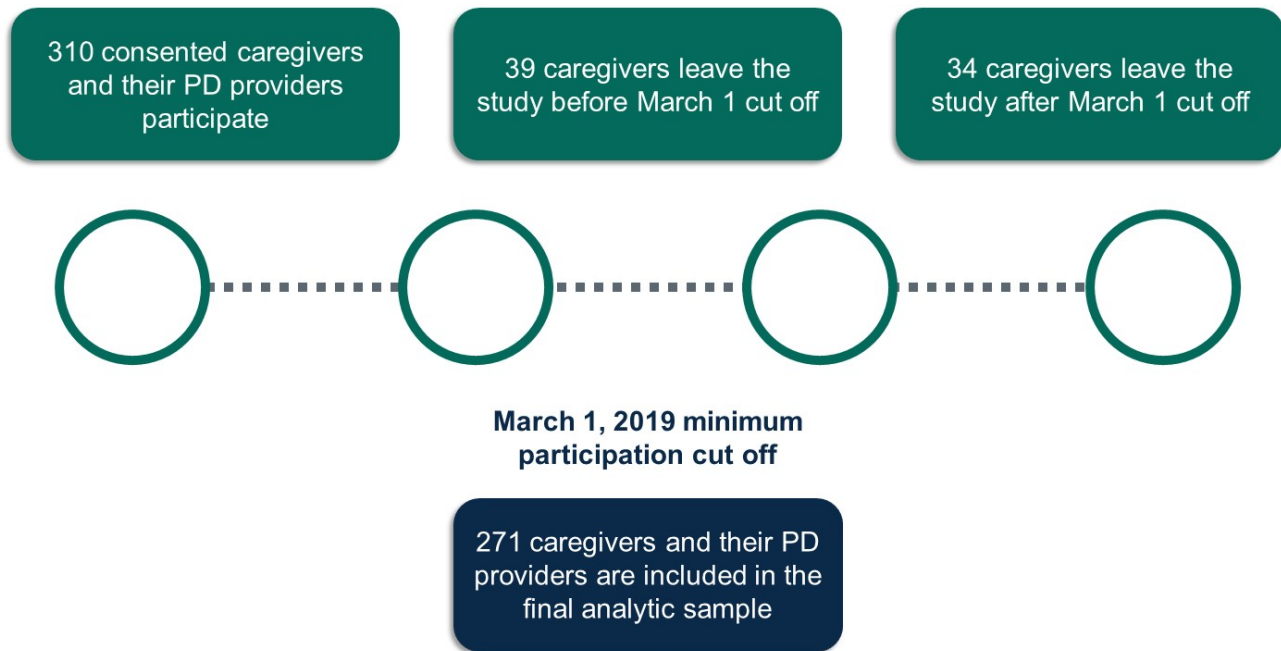
¹⁷ At this time, WGT materials are only available in English. Caregivers were ineligible to participate if half or more of classroom time was spent using languages other than English or Spanish. During recruitment, the team asked caregivers if they would be comfortable using materials written in English. Caregivers were considered to be eligible if they said they were comfortable in doing so.

¹⁸ We obtained consent electronic ally from 100 percent of PD providers. We collected consent on paper from more than 20 percent of caregivers while we were conducting Q-CCIIT observations on site.

¹⁹ Six caregivers and one PD provider reported in the feedback survey that they participated in WGT for one month. We retained them in the final analytic sample because they did not drop from the study before March 1, 2019.

had participated in the intervention (the full implementation period was four months). Another 34 consented caregivers left the study after March 1, 2019. Those who left typically emailed the study inbox or called the toll-free hotline to inform the study team. Reasons for leaving the study included participants leaving their position, demands of other program requirements, and caregivers or PD providers having a paired member leave the study. Exhibit II.2 illustrates attrition over time.

Exhibit II.2. WGT attrition over time



2. Final analytic sample

The final analytic sample, defined as those who met the minimum participation criteria outlined above, included 271 pairs: 271 caregivers and 168 PD providers. Of the 168 PD providers, 93 were paired with more than one caregiver. The sample included 214 center-based classrooms (89 were affiliated with EHS and 125 were community-based child care programs) and 57 FCCs, of which 16 were affiliated with EHS (Exhibits II.3–II.4).

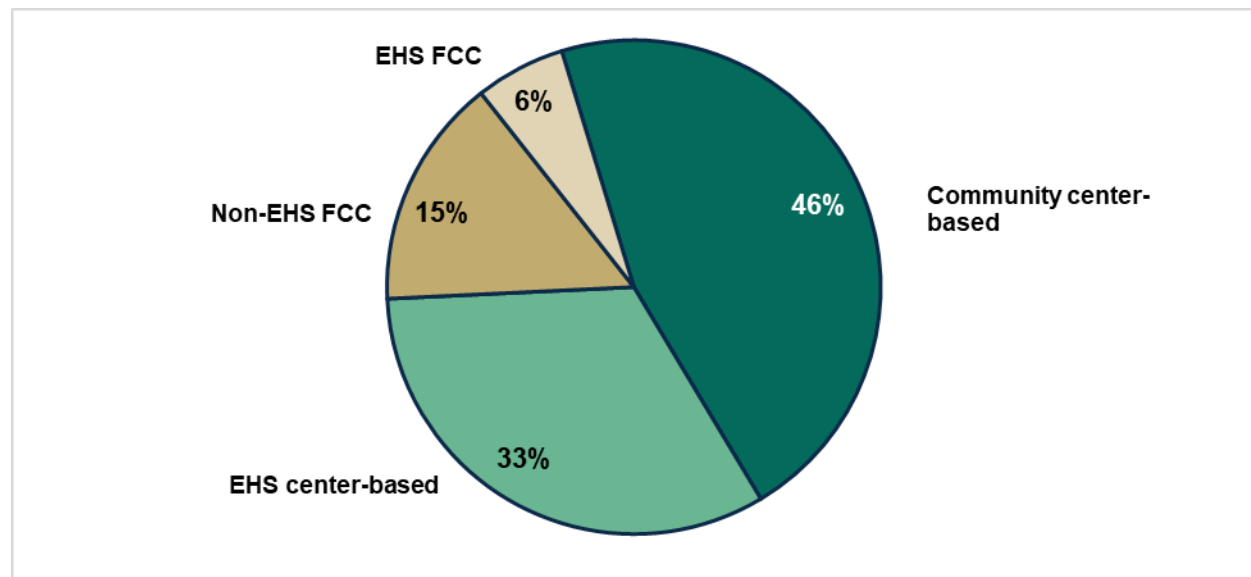
Of the 271 pairs who met the criteria, we also determined that all caregivers completed the background survey or the fall 2018 Q-CCIIT observation, and PD providers within a pair participated at least minimally in the PD provider training (defined as attending at least one webinar or logging onto the WGT website during the training period). In one case, we could not verify that a PD provider had taken part in training; because they continued to use the website, we retained them in the analytic sample.

Exhibit II.3. Final WGT analytic sample (pairs)

Location	Community			Total caregivers	Total PD providers	Total # pairs in sample ¹
	EHS center-based pairs	center-based pairs	FCC pairs			
DC/MD/VA	3	30	4	37	25	37
MA	20	9	1	30	20	30
OK	8	20	8	36	23	36
NJ/PA	5	20	8	33	21	33
IL	19	0	10	29	17	29
FL	9	20	7	36	23	36
OH	4	9	3	16	10	16
WA	6	6	2	14	7	14
CA	15	3	10	28	16	28
AZ	0	8	4	12	6	12
Total	89	125	57	271	168	271

¹ The final analytic sample represents the study participants as of March 1, 2019, eight weeks after the start of the implementation.

Exhibit II.4. Final WGT analytic sample pairs, by type of caregiver setting



Source: Fall 2018 WGT Classroom roster.

D. Data collection procedures

This section presents the various data collection activities, timelines, and response rates.

1. Measurement design

For each data collection instrument, Exhibit II.5 identifies the data source, respondent, and data collection approach, and summarizes which constructs it addressed.

Exhibit II.5. Data collection activities, by data source and key constructs measured

Data source	Respondent	Data collection approach	Key constructs measured
Caregiver background survey	Caregiver	Web/PaPI	Caregiving experience and education; knowledge and beliefs about child development; thoughts about change; knowledge and beliefs about caregiving and learning; curriculum and approaches to caregiving; administrative and PD support; awareness of and access to resources; beliefs about the benefits of PD; experiences with PD outside of WGT; existing caregiver-PD provider relationship; technological literacy; stress and well-being; demographics
PD provider background survey	PD provider	Web/PaPI	Experience providing PD; education and career; knowledge and beliefs about child development; knowledge and beliefs about caregiving and learning; support available from networks and/or supervisors; use of online resources; beliefs about PD strategies and change; PD approaches outside of WGT; technological literacy; demographics
Caregiver feedback survey	Caregiver	Web/PaPI	Knowledge and beliefs about child development; beliefs about the benefits of PD; knowledge and beliefs about caregiving and learning; administrative and PD support; reflecting on WGT; self-reported change; goals selected; satisfaction with WGT; feedback on WGT modules and handouts; use of online resources; caregiver-PD provider relationship during WGT; communication and barriers encountered during WGT; other PD experiences and topics
PD provider feedback survey	PD provider	Web/PaPI	Knowledge and beliefs about child development; beliefs about PD strategies and change; knowledge and beliefs about caregiving and learning; thinking about WGT; satisfaction with WGT; feedback on WGT activities; self-reported change; use of online resources; challenges in supporting caregivers during WGT; use of PD strategies
Web user tracking data	Caregiver and PD provider	Web user data	User data (for example, frequency PD tools accessed); average time spent with practices; content received (which modules and key practices reviewed, and how often)
Pop-up questions on website ^a	Caregiver and PD provider	WGT website	Learning preferences (caregivers only); number and length of PD provider meetings; methods of communication; time spent on website; time spent working on PD in and outside of classroom; number of times self-video-recorded
Help desk	WGT study team	Help desk documentation	Participants' queries and issues during implementation of PD; website or iPad technology issues; questions about data collection activities; PD support and meeting logistics; participation changes; PD tools content and progress; and continuation of PD post-intervention ^b

Data source	Respondent	Data collection approach	Key constructs measured
Webinar participation	WGT study team	Webinar attendance and notes	Webinar attendance information; PD providers' inquiries about meeting logistics, strategies for PD provider support, technology challenges, website navigation, and continuation of PD post-intervention
Q-CCIIT measure	Observer	PaPI observation	Caregiver-child interactions (support for social-emotional development, support for language and literacy development, support for cognitive development, areas of concern)
Classroom roster	Caregiver	PaPI	Age, gender, and number of children present; type of setting; languages spoken; number of caregivers in the classroom

^a There were two versions of the pop-up survey: one for caregivers and another for PD providers.

^b The help desk included a toll-free hotline and email options.

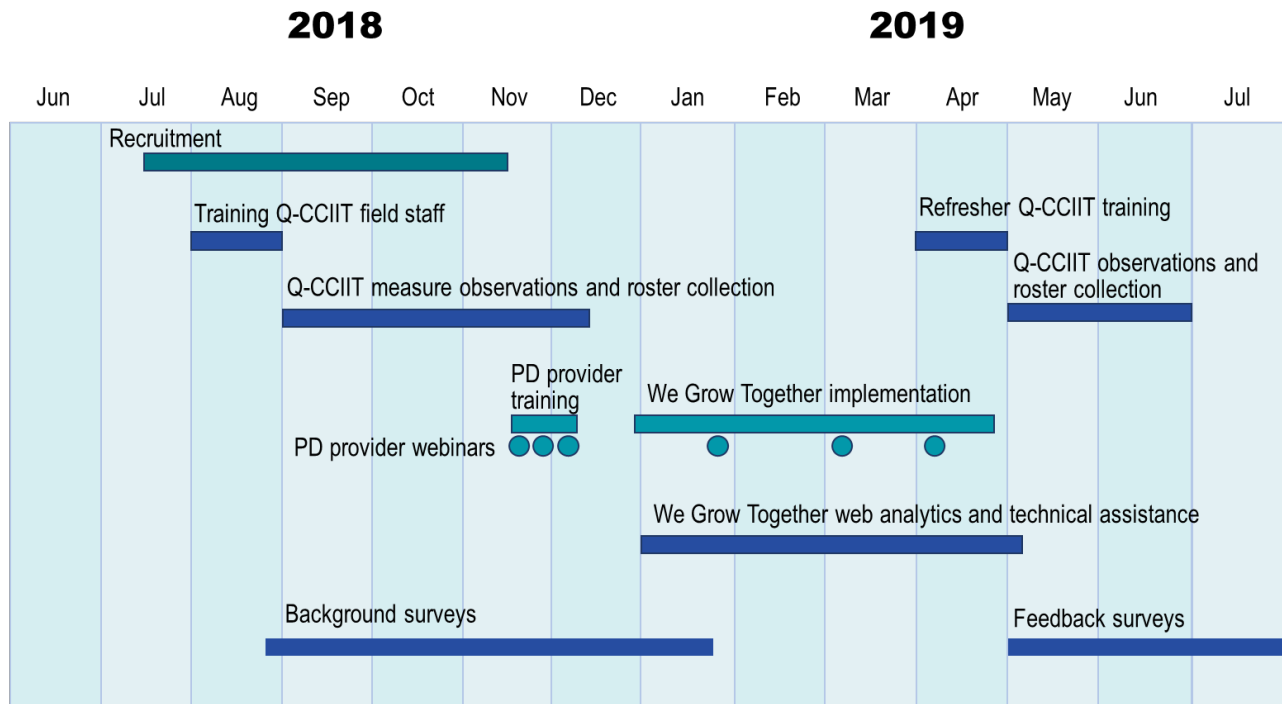
PaPI = paper and pencil instrument.

2. Data collection timeline

Exhibit II.6 depicts the timeline for the WGT field test, including all data collection activities.

- We trained recruiters in July 2018 and continued recruitment into November 2018, when we exceeded our target of enrolling 300 pairs.
- We collected web-based background surveys for caregivers and PD providers from September 2018 through January 2019.
- Observers administered fall Q-CCIIT observations from September through December 2018.
- We trained PD providers on the WGT system in November and December 2018.
- During WGT program implementation, we collected web user tracking data from November 2018 through April 2019 and asked a small number of pop-up survey questions on the website each month from February through April 2019. Caregivers and PD providers actively took part in WGT implementation starting in early January 2019. We also tracked queries to our help desk, toll-free hotline, and website discussion boards, as well as those that arose during implementation webinars and additional call-in office hours we offered to support PD providers. WGT program implementation concluded at the end of April 2019.
- We conducted follow-up data collection activities that included spring Q-CCIIT observations and web-based feedback surveys for caregivers and PD providers, from May through July 2019.

Exhibit II.6. Data collection timeline



3. Data collection sample and response rates

Exhibit II.7 shows the sample for each data collection instrument.

Below, we present detailed information on each of the data collection activities in the order in which they occurred, beginning with the caregiver and PD provider background surveys.

Caregiver and PD provider background surveys. From September 2018 to January 2019, we asked all 271 caregivers and 168 PD providers in the analytic sample to report information via a web survey about topics such as their background characteristics (for example, demographics, education, and experience) and knowledge and beliefs about child development. Some topics were specific to caregivers, such as their willingness to change their practices; some topics were specific to PD providers, such as their experience providing professional development. The median time it took for all caregivers and PD providers to complete the background survey was 37 minutes.²⁰

Based on the analytic sample, we achieved a 98 percent response rate for the PD provider background survey and a 97 percent response rate for the caregiver background survey (Exhibit II.8). We achieved these high response rates by sending weekly email reminders with a link to the survey to PD providers and caregivers. A subset of caregiver background surveys was completed on paper instead of through the web. Of caregivers in the analytic sample who completed background surveys, 32 percent chose to complete a paper survey during the fall classroom observations. Caregivers were given the paper option only if they had not completed the online survey at the time of their fall observations.

²⁰ This information is based on everyone who took the survey; however, subsequent data are based on the analytic sample.

Exhibit II.7. Number of participant responses, by instrument

Sample	Background survey		Fall observations	PDP pop-up survey, February		PDP pop-up survey, March		PDP pop-up survey, April		Feedback survey		Spring observations
	CGs	PDPs	CGs	CGs	PDPs	CGs	PDPs	CGs	PDPs	CGs	PDPs	CGs
Invited	310	187	310	283	172	271	168	271	168	303	180	271
Total completed ¹	295	180	301	123	66	136	79	125	66	265	162	244
Analytic sample completes ²	263	166	267	123	66	136	78	125	66	252	154	244

Note: This exhibit includes all PD providers and caregivers actively participating at the launch of the particular data collection activity. For example, PD providers were invited to the February pop-up survey only if they had not dropped out of the study at the time of the initial February survey launch.

CGs = caregivers; PDPs = PD providers.

¹“Completed” represents the number of participants who completed the instrument out of all of those invited.

²“Analytic sample completes” represent the number of participants in the final analytic sample who completed the instrument.

Exhibit II.8. Background surveys

Sample	Caregivers	PD providers
Background surveys released ¹	271	168
Completed background surveys	263	166
Partially completed background surveys	4	2

Note: This exhibit represents background survey responses from 271 caregivers and 168 PD providers in the final analytic sample.

¹ The numbers of PD providers and caregivers with released surveys do not match because some PD providers were assigned more than one caregiver.

Pop-up web surveys. We invited all 271 caregivers and 168 PD providers in the analytic sample to complete pop-up questionnaires on the WGT website from February 2019 through April 2019. At three times during implementation of the WGT program, we asked caregivers and PD providers about how they were using the PD materials outside of the time they spent on the website, and how they were working together (for example, how frequently caregivers had attended meetings with the PD provider in the last month, and what their methods of communication had been). The pop-up questions appeared each time a person logged onto the WGT website until they were complete, or when three weeks had passed. Caregivers took around 3.9 minutes to complete the pop-up questions; PD providers took 1.7 minutes. If PD providers and caregivers did not complete the pop-up questions at the beginning of the month, we sent them an email reminder approximately two weeks later. In total, 68 percent of caregivers and 62 percent of PD providers from the analytic sample responded to the pop-up survey at least once. The number of participants asked to complete the pop-up survey decreased slightly over the course of implementation because of study attrition. Exhibit II.9 provides details on pop-up survey responses.

In addition to the pop-up questions, when caregivers first accessed the WGT website, we asked them to complete a one-time, 10-minute web survey on their learning preferences. We used this information to recommend specific materials for the caregiver and made the results available to the PD provider and caregiver to help inform the PD process. Two hundred and nine caregivers completed their learning preferences survey.

Exhibit II.9. WGT pop-up survey responses

Did not complete a pop-up survey		Completed only one pop-up survey		Completed two pop-up surveys		Completed three pop-up surveys	
N	Percentage	N	Percentage	N	Percentage	N	Percentage
Caregivers							
87	32.1	53	20.0	62	22.9	69	25.5
PD providers							
64	38.1	29	17.3	44	26.2	31	18.5

Note: This exhibit represents pop-up survey responses from 271 caregivers and 168 PD providers in the final analytic sample.

Caregiver and PD provider feedback survey. After completion of the WGT program’s implementation, we asked all 271 caregivers and 168 PD providers in the analytic sample to complete a web-based feedback survey from May 2019 through July 2019. The feedback survey included a subset of the questions contained in the background survey and new items related to experiences with the WGT

system. For example, the feedback survey asked about satisfaction with PD (tools, website, process, and content), any changes in practices, and awareness of and access to available resources. We also collected information on the challenges caregivers and PD providers faced in balancing their ongoing work with PD activities. We asked the caregivers how satisfied they were with their relationship with the PD provider—for example, whether the caregiver believed the PD provider showed trust and respect for them. The median completion time for the feedback survey was approximately 52 minutes.

We achieved a 90 percent response rate for the PD provider feedback survey and a 93 percent response rate for the caregiver feedback survey (Exhibit II.10). To achieve these response rates, we sent weekly email reminders with a link to the survey to PD providers and caregivers. We also collected paper surveys from 12 percent of caregivers during the classroom observations if they had not already completed the survey on the web. Finally, we made weekly reminder telephone calls to all PD providers and caregivers who had not completed the survey in June and July 2019 to remind them and offer the option to complete the survey by telephone. Only one caregiver opted to complete the survey by telephone. Exhibit II.10 provides details on feedback survey response.

Exhibit II.10. Feedback surveys

Sample	Caregivers	PD providers
Feedback surveys released	271	168
Completed feedback surveys	253	152
Partially completed feedback surveys	5	4

Note: This exhibit represents feedback survey responses from 271 caregivers and 168 PD providers in the final analytic sample.

E. Training field staff on the Q-CCIIT observation measure

The WGT study team conducted two in-person observer trainings in August 2018 on the Q-CCIIT observation measure to prepare for fall data collection, and a remote refresher training in spring 2019 to prepare for spring data collection.^{21, 22} Below, we outline the training logistics, certification procedures, reliability calculations, and certification outcomes.

Certification procedures. Certification at the end of each training was based on reliability with the Q-CCIIT instrument developers’ scores. For the summer 2018 training, field staff completed certification by coding videos on the final day of training. Certification involved coding two separate certification video files—each with three 10-minute cycles. The videos represented two settings: a center-based classroom and an FCC. Certification for the spring 2019 refresher training involved coding three 10-minute cycles from a single classroom. Certification videos were meant to mirror live coding in classrooms, meaning the trainees watched video segments without pausing or rewinding. Twenty observers were certified in the fall, and 16 in the spring.

Reliability requirements and calculations. As in previous Q-CCIIT trainings, we required adjacent agreement (within one point of the master codes). To be certified, trainees must achieve at least an overall

²¹ In-person data collection included only Q-CCIIT observations in fall and spring. All other data collection activities occurred via web-based surveys and questionnaires.

²² In preparation for the field observer trainings and field period, the team also conducted a gold standard observer training in July 2018.

reliability level of 80 percent agreement for items across the whole measure and further demonstrate at least 75 percent agreement for each scale's items (Supporting Social-Emotional Development, Supporting Cognitive Development, Supporting Language and Literacy Development, and Areas of Concern).

In-field inter-rater reliability. In both fall and spring, we completed in-field inter-rater reliability Q-CCIIT observations with gold standard observers and all field observers. Field observers who did not meet reliability thresholds were given feedback during the consensus meeting with the gold standard observer right after the visit and then completed a second inter-rater reliability observation. In the fall, we completed 30 inter-rater reliability observations. Of the 30 visits, two observers did not meet reliability thresholds on their first attempt but did so on a second visit. In the spring, we completed 37 inter-rater reliability observations. All 37 met the thresholds.

Q-CCIIT observations in the field. All observations were scheduled in the morning during a typical day. Bilingual observers were sent to classrooms in which we expected Spanish to be spoken with children during the observation. In fall 2018, 23 certified observers completed 301 Q-CCIIT observations in caregivers' classrooms. We noted all the languages used in the classrooms during the observation. At the time of the fall observation, 99.6 percent of classrooms used English, 17.2 percent Spanish, and 2.3 percent another language. Five additional caregivers were unable to make their observations while our field team was in the area because of illness and other personal issues. These five caregivers participated in phone calls with a member of the study team to determine their WGT module recommendations. During this phone call, the study team member talked with each caregiver to determine the area in which the caregiver would most like to improve.

In spring 2019, 15 certified observers completed observations in 245 classrooms. At the time of the spring observation, 99.2 percent of classrooms used English, 14.3 percent Spanish, and 1.6 percent another language. With only one exception, observations were completed for all caregivers working in their original classrooms.²³ Nine percent of caregivers in the analytic sample were no longer working in their original classroom when we attempted to conduct their spring observation.

Classroom roster. During the observation visits, for the analytic sample we collected 266 classroom rosters in fall 2018 (98.2 percent) and 244 in spring 2019 (90 percent).

F. PD provider training and implementation support activities

Before the field test implementation period, PD providers attended an online training designed to orient them to the WGT system.

1. PD provider training

We invited PD providers to the PD provider training if they had completed their background surveys and were still participating at the end of November. This training took place four weeks before the WGT implementation period—between November and December 2018. Ninety-nine percent of PD providers in the analytic sample participated in the PD provider training,²⁴ during which we hosted three live 90-minute training webinars over four weeks to introduce WGT, demonstrate website navigation, discuss

²³ One caregiver did not receive a follow-up observation.

²⁴ One hundred seventy-three PD providers participated in the training; 168 represents the number of PD providers in the analytic sample. Participation included PD providers who attended a training webinar or spent time on the WGT website during the training period.

study logistics, and answer PD providers’ questions. Each training webinar was required and offered twice to accommodate PD providers’ schedules. In between training webinars, PD providers were required to log onto the website to complete training activities, which we tracked through web usage data. The training took approximately 12 hours total (3 hours per week). PD providers received a \$100 gift card upon completing the training.

Exhibit II.11 indicates how many PD providers in the analytic sample attended the three training webinars. Out of 168 PD providers, 76 percent attended at least one training webinar, whereas 24 percent did not attend any, and 31 percent attended all three. Throughout training, we reviewed website logins and training webinar attendance for PD providers. We contacted them through automated emails, telephone, and targeted emails to remind them to attend training webinars and log onto the website if we noticed they were not engaging with the training (for example, they did not attend training webinars or log onto the website). During outreach, we also helped PD providers troubleshoot logistical problems (for example, issues with logging on) to encourage participation. Webinar recordings of each session were available for those PD providers unable to attend the live session.

Exhibit II.11. Attendance at WGT PD provider training webinars

Did not attend a training webinar		Attended only one training webinar		Attended two training webinars		Attended three training webinars	
N	Percentage	N	Percentage	N	Percentage	N	Percentage
41	24.4	42	25.0	33	19.6	52	31.0

Note: This exhibit represents 168 PD providers in the final analytic sample.

At the completion of the PD provider training, 75 percent of all PD providers (129 out of 173²⁵) completed a 10-minute survey online. This survey enabled providers to provide feedback on training materials and experiences, and the PD provider tools. It also enabled them to share whether they felt prepared to support caregivers in using the WGT program. To encourage participation, in January and February 2019, we sent PD providers reminders to complete the training survey. We sent a total of four email reminders to them.

2. PD provider technical assistance and implementation supports

We provided TA to PD providers during the training and implementation periods. A phone hotline was available to offer TA in accessing the WGT website and materials. In addition, we monitored the study email address for questions or comments from participants. We also provided a discussion board on the website for PD providers to anonymously post questions or comments about PD. The WGT program team also responded to PD providers’ discussion board posts; addressed questions on the platform; and asked questions to encourage reflection, feedback, and celebration of successes.

During the implementation period, we encouraged PD providers to use the PD provider tools on the website to support their work with caregivers. We also hosted three one-hour live implementation webinars available in February, March, and April. The initial webinar addressed areas for which PD providers had noted the need for more information and training (after their training sessions.) For the

²⁵ PD provider training surveys were administered anonymously. As a result, it is not possible to report training survey responses based only on the PD providers included in the analytic sample (n = 168). At the time of survey administration, 173 PD providers were considered to be participating in WGT and therefore invited to the survey.

latter two implementation webinars, we asked PD providers to submit questions for the trainers in advance.²⁶ During the implementation webinars, PD providers could also send questions directly to the host or post them anonymously so other webinar participants could see them. The WGT program team answered these questions during the implementation webinars, and we documented those answers within searchable presentation PDFs made available after each implementation webinar. In an ongoing response to PD providers' requests, we created new or updated PD provider tools, such as SMART goal templates with examples.

G. Recommended modules based on Q-CCIIT observation scores

We used individual caregivers' Q-CCIIT scores from the fall classroom observations to inform which three WGT modules to highlight on each caregiver's home page on the website. Caregivers and their PD providers could see and access the three recommended modules at the start of the implementation period (January 2019).

Although we guided caregivers to three specific modules, they coordinated with their PD providers to choose which of the key practices within the modules to work on. The primary goal in initially presenting only three modules was to guide caregivers to modules about practices on which they could improve, based on their Q-CCIIT observation. Participants could access the other WGT modules if they chose. We wanted buy-in and caregiver ownership of the goals selected but did not want to overwhelm them with too many options.

We developed an algorithm using Q-CCIIT scores to assign caregivers to sets of three WGT modules. We gave priority to Support for the Social-Emotional Development and Support for Language and Literacy Development modules over the Support for Cognitive Development module. We used this priority order based on evidence that suggests a hierarchy of relative importance among infant and toddler caregiving practices.

Scores on each Q-CCIIT dimension and domain range from 1 (least responsive caregiving) to 7 (most responsive caregiving); scores above 4 indicate that the caregiver is implementing the practices responsively and with some level of competence. In creating module assignments, we prioritized a positive relationship and responsiveness with children. Thus, caregivers with a low rating on the positive relationship dimension would be assigned to work on the modules of Build Caregiver-Child Relationships, Support Children's Language Use, and Support Peer Interaction and Play (age specific). Caregivers with ratings of 4 or above on a positive relationship would be assigned modules based on their scores on other items.

If caregivers displayed low scores on all domains, we recommended modules on caregiver-child relationships, supporting children's understanding of language, and regulation of behavior and emotions. If caregivers scored high on social-emotional support and lower on language, we suggested three modules on supporting language and literacy. If caregivers had high scores on language support and low scores on social-emotional support, we pointed them to age-appropriate modules on social-emotional and cognitive development.

If caregivers had scores of 5 or above for social-emotional support and language but not for support for cognitive development, we suggested focusing on support for children's understanding of language,

²⁶ We offered each live webinar twice to maximize participation across time zones; one of each of these webinars was audio-recorded and available via the website.

support for cognitive development, and support for peer interactions. If caregivers scored above 5 on all subscales, we suggested focusing on modules with key practices that our Q-CCIIT psychometric analysis indicated were more challenging for caregivers generally—specifically, cognitive development practices, responding to emotional cues, and supporting self-regulation.




H. Participation in WGT

Once caregiver-PD provider pairs selected the first module on which to focus, they set goals for practice and worked at their own pace to implement new skills. They could use the website and contact the WGT study team for TA throughout the implementation period.

Recommended WGT implementation activities

We suggested caregivers work with their PD provider and use WGT materials for approximately 1.5 hours per week. This time included completing video reflections at least once a week and spending time reviewing materials on the WGT materials. For each module on the WGT website, there was a set of standard recommended tools and a set of additional resources available.

PD providers were asked to communicate with caregivers at least weekly and attend a longer meeting at least monthly. PD providers were guided to set SMART goals and use action plans to collaborate with their caregivers to set goals and steps to achieve them.

 <p>Learn about the website</p>	<ul style="list-style-type: none"> • Review the email with information about how to access the We Grow Together website • Log onto the We Grow Together website using the user name and password you received by email • Explore the introductory materials • Watch the video on the We Grow Together website
 <p>PD provider and caregiver meet</p>	<p>In the initial meetings:</p> <ul style="list-style-type: none"> • Set overall goals for using We Grow Together, get to know one another, and discuss preferences and interest areas for professional growth • Log onto the We Grow Together website together and review the caregiver's recommended modules • Watch the introductory video for a recommended module, decide which key practices within the module to try (you do not have to select all practices within the module) • Discuss resources that may be useful based on caregiver learning preferences and goals • Caregivers and PD providers collaboratively set goals between exploring the video and creating an action plan
 <p>Use We Grow Together</p>	<ul style="list-style-type: none"> • Visit the We Grow Together website to watch the presentation and work with the recommended tools for each key practice of interest • Caregivers: video record yourself with the iPad and self-reflect at least once per week • Caregivers and PD providers: discuss these videos and reflections and use the resources, touching base weekly, with a longer planning and feedback meeting at least monthly

1. Web usage data

From November 2018 through April 2019, we collected web usage tracking data from the WGT website on both caregivers and PD providers, noting login frequency, tools accessed, and length of time spent on the website. Between November and December 2018, we sent caregivers invitations to log on and familiarize themselves with the website. Caregivers formally began WGT implementation with their PD providers in early January 2019. If caregivers or PD providers did not log onto the website for at least 10 minutes in any month, we sent them an email and followed up with a reminder call inviting them to return to the website. We also collected information from web usage data about caregivers' learning preferences within the WGT website. The data tracked the time the primary web page was open (a proxy for use of the website). The data did not capture time spent on linked PDFs, which included most content for key practice tools and resources. Below is a summary of the web usage data for participants in the analytic sample. Exhibit II.12 describes the key terms used in Exhibits II.13–II.16, which provide details on website usage.

- 93.4 percent of caregivers and 100 percent of PD providers logged time on the WGT website.
 - From January 1 (start of implementation) through April 15 (16 weeks), 25 to 60 percent of caregivers spent time on the website in any given week. In that same time frame, 12.5 to 69.6 percent of PD providers spent time on the website in a given week.
- Cumulatively, caregivers spent between 59.0 seconds and 24.7 hours, and PD providers spent between 3.8 minutes and 17.4 hours on the website during the entire study period.
 - The median amount of total time that caregivers spent on the website was 3.0 hours. The median amount of total time that PD providers spent on the website was 3.3 hours.
 - 13.3 percent of caregivers and 16.0 percent of PD providers spent 1 hour or less on the website.
 - A small group of caregivers (6.6 percent) and PD providers (7.7 percent) spent more than 10 hours on the website.
- PD providers spent the most time in the training and introductory modules; caregivers spent the most time in their recommended modules.
 - Every week throughout the study, PD providers averaged spending 16 to 22 minutes on the training and introductory modules, which contained PD provider-specific tools and resources.
 - The maximum amount of time spent on the WGT website each week was greater for caregivers (56.9 minutes) than PD providers (40.2 minutes).
 - 9 percent of caregivers did not spend any time on their recommended modules; 31.5 percent of PD providers did not spend any time in the modules recommended to their caregivers.
- PD providers were most likely to access the website during the PD provider training period (Weeks 4–7) and early weeks of implementation (Weeks 5–12). PD provider web usage began to taper off during Week 14.

Exhibit II.12. Definitions of key terms for web usage data

Key term	Definition
Training and introductory modules	For caregivers, includes introductory materials and learning preferences quiz. For PD providers, includes the PD provider training, PD provider resources and tools, and PD provider discussion board.
Caregivers' recommended modules	Includes all web content contained in the caregiver's three recommended modules as well as the key practices, discussion boards, and links to additional resources within those modules. For PD providers, includes the recommended modules for each of their paired caregivers. Modules were recommended based on areas for growth according to the Q-CCIIT measure conducted during an initial observation.
Additional modules	Includes all web content contained in the remaining modules not recommended to a caregiver. Caregivers and PD providers could visit additional modules for a more comprehensive learning experience.
Other pages	Includes administrative pages, caregiver profiles, "about us," "contact us," and module landing pages.

Exhibit II.13. Number of active users, by page type

Page types	Caregiver		PD provider	
	N	Percentage ^a	N	Percentage ^b
Website total	253	93.4	168	100.0
Training and introductory modules	252	93.0	168	100.0
Recommended/caregivers' recommended modules	247	91.1	115	68.5
Additional modules	122	45.0	88	52.4
Other pages	253	93.4	168	100.0

Notes: This exhibit represents web usage between November 3, 2018 and April 30, 2019 for participants in the final analytic sample.

^a Percentage represents the number of caregivers that accessed each page type, divided by the total number of caregivers (271) in the analytic sample.

^b Percentage represents the number of PD providers that accessed each page type, divided by the total number of PD providers (168) in the analytic sample.

Exhibit II.14. Average weekly and total time spent on WGT website, by page type

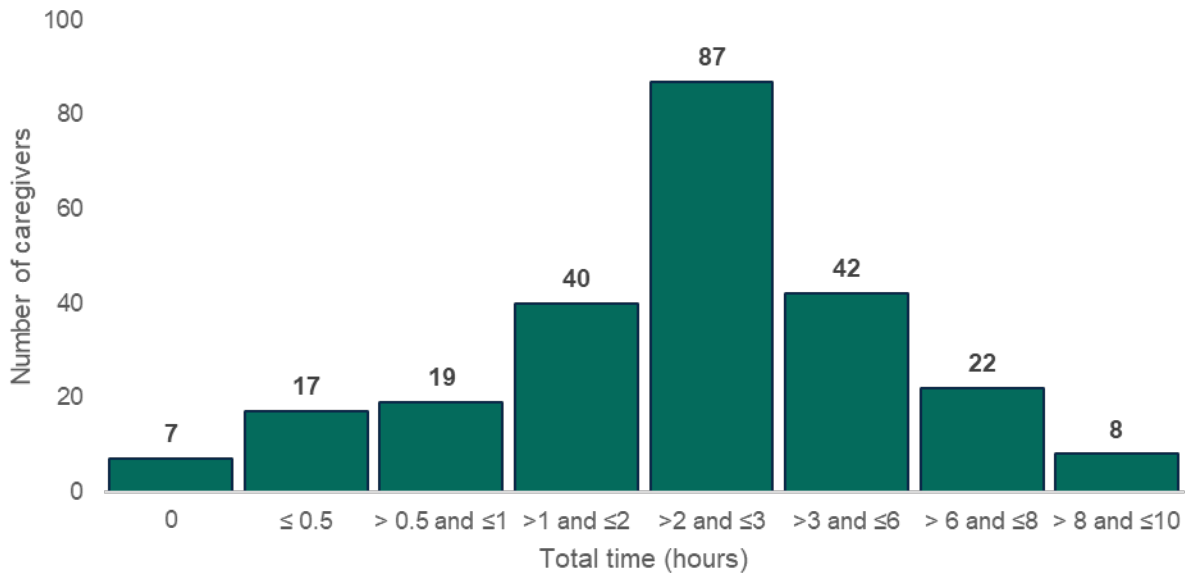
	Average weekly time spent ^b (min)		Total time spent ^a (min)		Total time spent (hr)	
	Caregiver	PD provider	Caregiver	PD provider	Caregiver	PD provider
Website total						
Average	9.0	9.6	234.8	250.5	3.9	4.2
Min	0.0	0.2	1.0	3.8	0.0	0.1
25th percentile	3.8	3.8	99.8	28.8	1.7	1.7
50th percentile	7.0	7.6	182.0	198.7	3.0	3.3
75th percentile	11.6	12.5	302.4	325.3	5.0	5.4
Max	56.9	40.2	1,480.4	1,046.4	24.7	17.4
Training and introductory modules						
Average	0.4	6.5	9.5	169.4	0.2	2.8
Min	0.0	0.1	0.0	1.5	0.0	0.0
25th percentile	0.2	3.0	4.7	75.4	0.1	1.3
50th percentile	0.3	5.1	7.7	132.5	0.1	2.2
75th percentile	0.5	9.1	11.6	237.7	0.2	4.0
Max	2.8	35.4	70.9	921.3	1.2	15.4
Caregivers' recommended modules						
Average	6.6	1.4	172.7	36.7	2.9	0.6
Min	0.0	0.0	0.0	0.0	0.0	0.0
25th percentile	2.6	0.0	67.4	0.0	1.1	0.0
50th percentile	5.2	0.4	134.3	9.3	2.2	0.2
75th percentile	9.2	1.6	238.4	40.4	4.0	0.7
Max	40.2	17.3	1,045.1	450.4	17.4	7.5
Additional modules						
Average	0.8	0.6	20.2	14.2	0.3	0.2
Min	0.0	0.0	0.0	0.0	0.0	0.0
25th percentile	0.0	0.0	0.0	0.0	0.0	0.0
50th percentile	0.0	0.0	0.0	0.1	0.0	0.0
75th percentile	0.5	0.7	11.9	18.1	0.2	0.3
Max	12.4	6.2	328.9	160.8	5.5	2.7
Other pages						
Average	1.3	1.1	32.4	29.2	0.5	0.5
Min	0.0	0.0	0.1	0.2	0.0	0.0
25th percentile	0.5	0.2	12.6	6.7	0.2	0.1
50th percentile	1.0	0.8	24.0	21.8	0.4	0.4
75th percentile	1.8	1.6	44.4	40.8	0.7	0.7
Max	8.4	6.9	210.1	179.0	3.5	3.0

Notes: This exhibit represents web usage between November 3, 2018 and April 30, 2019 for participants in the final analytic sample.

^a Total time spent is the amount of time individual participants spent logged onto the WGT website between November 3, 2018 and April 30, 2019.

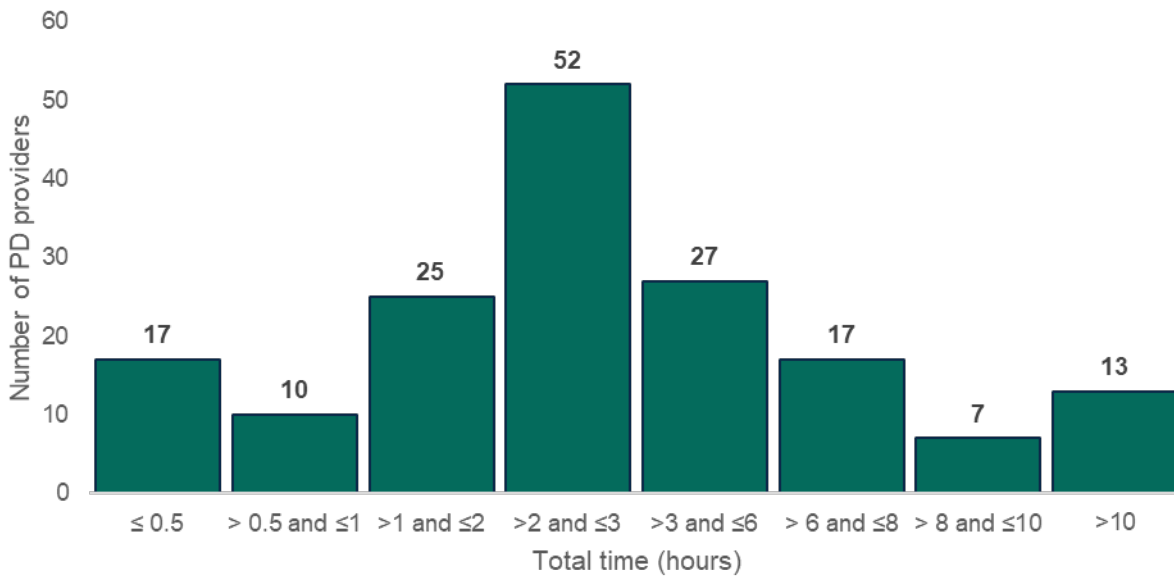
^b Average weekly time spent is an average of individual participants' weekly time spent logged onto the WGT website between November 3, 2018 and April 30, 2019.

Exhibit II.15. Total time caregivers spent on WGT website



Notes: This exhibit represents web usage between November 3, 2018 and April 30, 2019 for participants in the final analytic sample. A total of 253 caregivers logged onto the WGT website.

Exhibit II.16. Total time providers spent on WGT website



Notes: This exhibit represents web usage between November 3, 2018 and April 30, 2019 for participants in the final analytic sample. A total of 168 PD providers logged into the WGT website.

2. Accessing technical assistance

Help desk/hotline/discussion board technical assistance

We tracked questions we received from participants through our study toll-free number, emails to the study email address, and posts to the WGT website discussion boards. Senior members of the WGT project team also held monthly office hours. PD providers were able to schedule times to obtain one-on-one feedback about the PD materials and working with their caregivers. Respondents contacted us for a variety of reasons, including questions about recruitment, working with their caregiver or PD provider, challenges using the iPads, assistance in completing surveys, and gaining access to materials beyond the implementation period.

We also reached out to participants through phone calls and emails to remind them of WGT participant expectations and provide information on data collection activities. Through these contacts, we helped pairs access and use WGT based on their individual needs. We also actively made decisions about participants' involvement with WGT, given the realities of early childhood setting contexts. For example, we supported caregivers in finding replacement PD providers if a caregiver's original PD provider was unable to spend the required time in supporting the caregiver.

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III. Analysis

This section outlines activities to prepare the WGT field test data for analysis and reporting before describing the analytic approaches we used to answer the research questions and address methodological challenges.

A. Preparation of data for analysis

1. Data quality checks and nonresponse bias analyses

The WGT field test team conducted quality checks of the data and assessed missingness. The rates of nonresponse on the background and feedback surveys did not exceed 20 percent overall or for any specific item used in the multivariate or descriptive analyses (see Chapter II for details).

Nonresponse rates for the pop-up surveys exceeded 20 percent across and within the surveys. Therefore, we conducted nonresponse bias analyses to determine whether responses were representative of caregivers and PD providers overall. In total, 191 caregivers (70.4 percent) and 103 PD providers (61.3 percent) completed or partially responded to a pop-up survey at least once. Response rates were similar across subgroups, with no statistically significant differences between caregivers in FCCs versus center-based settings, infant versus toddler classrooms, community-based versus EHS, or caregivers whose supervisor was also their PD provider versus not. The only relationship noted in the data was between low WGT website usage (lowest quartile of usage) and nonresponse on the pop-up surveys. This finding is logical, given that the pop-up surveys were administered within the WGT website. However, some caregivers answered only one or two of the pop-up surveys, and at differing points in the study. Each survey asked about activities conducted in the previous week and were intended to give a more reliable estimate of the dosage of different activities. Given the high level of missingness and concerns about the validity of variables constructed on only one or two responses, we decided not to use the pop-up survey responses in our analyses.

2. Variable construction

Self-report measures. We constructed summary variables and scales, and assessed the quality and psychometric properties of the constructed variables. To construct variables, we combined information across instrument sources or multiple items within a single data collection instrument. The research questions and recommended constructs for the surveys guided the set of variables and scales we developed. For example, we constructed scales for mental health and knowledge and beliefs about child development based on the developers' scales. For newly developed items about caregivers' and PD providers' beliefs about supporting children's development, we examined the correlations among items and item-total correlations of the theoretical scales. We also conducted exploratory factor analyses of the newly developed beliefs items. We assessed the internal consistency reliability of all survey measures using coefficient alpha and examined the correlations among scales, looking for evidence of convergent and discriminant validity. We selected the scales with the strongest evidence. If a scale had responses on at least 75 percent of the component items, we imputed the mean for the missing data, increasing the sample size for those scales.

Measures of caregiver-child interaction quality. Measures of caregiver-child interaction quality used ratings from the Q-CCIIT observations. We estimated W-scores using item response theory (IRT)

analysis with all of the positive items and each of the domains (Atkins-Burnett et al. 2015). IRT allows for estimation of scores when data are missing and increases precision in estimating change beyond what we would achieve using a raw score. We applied a one-parameter Rasch rating scale model to each subscale²⁷ and then to all items. IRT accounts for the relative difficulty of the different observed practices. We report the Rasch model reliability in addition to the alpha coefficient.

Rasch models offer several advantages beyond a raw score. As noted, Rasch measures consider the relative difficulty of reaching higher quality on each of the dimensions/items in the Q-CCIIT. Some practices are easier to implement than others. Therefore, improving one rating category on a practice that is easy to implement does not have the same meaning for quality as improving one rating category on a practice more challenging to implement. Similarly, Rasch models do not assume that the distance between categories is equivalent (for example, whether the difficulty of moving from a rating of 2 to a 3 requires the same effort as moving from a 4 to a 5).

As with all IRT scores, Rasch measures are interval-level scores, rather than ordinal; thus, they are more precise in measurement. The difficulty of an item (in this case, implementing a practice with quality) is estimated on the same interval scale as ability (in this case, the caregiver's overall interaction quality), so knowing a caregiver's score provides some information about the different skills/practices the caregiver uses. Rasch and other IRT measures are in logits, often estimated with a mean of 0, resulting in negative scores for individuals scoring below the mean item difficulty.

In WGT, we transformed the logits to W-scores (Woodcock 1999) that have a mean difficulty of 500. W-scores contain additional properties that improve interpretation of a person's score relative to the difficulty of an item (Woodcock 1999). Appendix D includes additional information about the Rasch measures and W-scores. Appendix Exhibit D.1 illustrates the distribution of quality among the WGT sample of caregivers relative to the item difficulties.

Dosage variables. Dosage variables indicate how involved a participant is in the intervention. Deciding on what to use as a dosage variable for WGT was an important decision. Our original plan had been to use the monthly pop-up surveys that asked about WGT activities conducted in the seven days before completing the brief survey. After looking at missingness patterns (as described above), we decided to use the web usage tracking data collected from the caregivers' use of the website. Knowing that there would be multicollinearity among the indicators, we conducted analyses to select the best indicator (see Appendix E.III). The quartile for the number of PDFs opened by the caregiver was selected as the primary dosage indicator for use in the multivariate models.

²⁷ Rasch models assume unidimensionality. Correlations among domain subscales were high. We created an overall Q-CCIIT composite but retained the individual subscales to examine associations with caregivers' primary goals. We also tested mean raw scores as a sensitivity check; there were fewer significant differences when using a score that does not adjust for the difficulty of a practice, as IRT does.

B. Analysis plan²⁸

1. Final WGT analytic sample and variation in sample size

We limited all analysis to the 271 pairs of study participants in the final analytic sample who met minimum participation requirements. The analytic sample comprised 271 caregivers and 168 PD providers.

Variation in sample size for items and scales in descriptive results

The sample size for different items and scales in the descriptive results varied, in part, based on the number of caregivers and PD providers in the analytic sample who were asked each item. Some items did not apply to all respondents. For example, in the caregiver background survey, the caregivers who had not worked with the WGT PD providers previously were not asked items about their relationship with the PD provider. In the feedback survey, participants reported only about the usefulness of the module on which they spent the most time working and the practices they tried in that module. In addition, scale scores may have more respondents than individual items (in other words, a larger N) because we imputed the mean for missing items for scales that had responses for at least 75 percent of the component items. Alternatively, if respondents answered fewer than 75 percent of the component items, the N for some items will be greater than the N for the scale.

2. Analysis methods for each research question

In this section, we describe the analysis methods and sources we used to answer each research question and sub-question (Exhibit III.1).

Exhibit III.1. WGT research question, by analysis methods and sources

Research question	Analysis methods	Sources
RQ1a. Who are the participants in the WGT field test?		
Who are the participants in the WGT field test?	<ul style="list-style-type: none"> • Descriptive analyses (means and standard deviations, range of responses) • Tests of significance of group differences between center-based classrooms and FCCs; EHS and community-based settings 	<ul style="list-style-type: none"> • Background survey • Classroom roster • Sample management system (SMS)
RQ1b. What tools and support help early childhood professionals to use the responsive caregiving principles covered by WGT to improve caregiver-child interactions?		
How frequently do caregivers and PD providers make use of WGT over the implementation period, and which tools do they access?	<ul style="list-style-type: none"> • Descriptive analyses (means and standard deviations, range of responses) 	<ul style="list-style-type: none"> • Feedback survey • Web usage data
How do caregivers and PD providers engage with the technological components of WGT (that is, usability of the website, accessing the website and tools within it, using the tablets)?	<ul style="list-style-type: none"> • Descriptive analyses (means and standard deviations, range of responses) 	<ul style="list-style-type: none"> • Feedback survey • Help desk documentation • Web usage data

²⁸ ClinicalTrials.gov Identifier: NCT03433872.

Research question	Analysis methods	Sources
Are participants satisfied with WGT (both the content and the tool types, such as the narrated presentations, summary handouts, and step-by-step guides)?	<ul style="list-style-type: none"> • Descriptive analyses (means and standard deviations, range of responses) • Bivariate correlations 	<ul style="list-style-type: none"> • Feedback survey • Help desk documentation
Are participants satisfied with the PD process (goal setting, action planning, practice and observation, reflection, feedback, trusting relationship)?	<ul style="list-style-type: none"> • Descriptive analyses (means and standard deviations, range of responses) • Content analysis 	<ul style="list-style-type: none"> • Feedback survey • Help desk documentation
What are the challenges and barriers to WGT implementation in infant/toddler settings?	<ul style="list-style-type: none"> • Descriptive analyses (means and standard deviations, range of responses) • Content analysis 	<ul style="list-style-type: none"> • Feedback survey • Help desk documentation • WGT documentation^a
Do answers to any of these primary questions differ by subgroups (caregivers and PD providers associated with FCCs versus center-based settings) or characteristics of caregivers and providers?	<ul style="list-style-type: none"> • Tests of significance of group differences between center-based classrooms and FCCs, and between EHS and community-based settings 	<ul style="list-style-type: none"> • Feedback survey • Classroom roster • SMS
RQ2. Can WGT be used by early childhood professionals to support change in beliefs, knowledge, or practice concerning infants and toddlers?		
Is four months' implementation of WGT associated with change in the quality of caregiver-child interactions, as measured by Q-CCIIT instrument scores (fall to spring)?	<ul style="list-style-type: none"> • Descriptive analyses (means and standard deviations, range of responses); t-tests of fall and spring means 	<ul style="list-style-type: none"> • Q-CCIIT observation scores
Is four months' implementation of WGT associated with change in caregivers' and PD providers' beliefs and knowledge about child development and caregiving (fall to spring)?	<ul style="list-style-type: none"> • Descriptive analyses (means and standard deviations, range of responses); t-tests of fall and spring means 	<ul style="list-style-type: none"> • Background survey • Feedback survey
Is four months' implementation of WGT associated with change in caregivers' self-efficacy as teachers (fall to spring)?	<ul style="list-style-type: none"> • Descriptive analyses (means and standard deviations, range of responses); t-tests of fall and spring means 	<ul style="list-style-type: none"> • Background survey • Feedback survey
Does the PD provider perceive a change in the PD provider's own practice after PD providers' training and four months' implementation of WGT?	<ul style="list-style-type: none"> • Descriptive analyses (means and standard deviations, range of responses) 	<ul style="list-style-type: none"> • Feedback survey
Does the caregiver perceive change in the caregiver's own practice after four months' implementation of Q-CCIIT PD tools?	<ul style="list-style-type: none"> • Descriptive analyses (means and standard deviations, range of responses); t-tests 	<ul style="list-style-type: none"> • Feedback survey
Do answers to these questions differ by subgroups (caregivers and PD providers associated with FCCs versus center-based settings) or characteristics of caregivers and providers?	<ul style="list-style-type: none"> • Tests of significance of group differences between center-based classrooms and FCCs, and between EHS and community-based settings • Multivariate regression analyses 	<ul style="list-style-type: none"> • Q-CCIIT observation scores • Background survey • Feedback survey • Classroom roster • SMS • WGT documentation (PD provider webinars)

^a WGT documentation includes PD provider attendance at training and webinars, PD provider discussion boards, webinars, and office-hour phone calls.

Multivariate analyses and multiple imputation

Most PD providers served two caregivers but could serve as many as five. To account for this situation in analyses, our plan included using hierarchical linear models (HLM) to examine change in caregivers' observed practices and self-reported knowledge and beliefs. The outcomes in the different models were the full Q-CCIIT W-score, the three Q-CCIIT domain W-scores, the caregiver-reported teacher self-efficacy (Teacher Opinion Survey; Geller and Lynch 1999) in the spring, and the caregiver's knowledge and beliefs as measured by the spring Early Head Start Family and Child Experiences Study (Baby FACES) Beliefs about Development scale.

With the unimputed data, we conducted unconditional models (without covariates) to examine the percentage of the variance in caregiver quality at the caregiver (level 1) and PD provider (level 2) levels. The PD provider level did not explain variance in the Q-CCIIT spring scores. After adding covariates in the model, none of the PD provider variables was significant in predicting any of the spring Q-CCIIT observation scores.

With level 2 not contributing significant variance, we added PD provider characteristics to the record of the caregiver partner(s) and used Full Information Maximum Likelihood (FIML) in Mplus (Muthén and Muthén 1998–2012) to estimate models that account for the missingness. Some researchers recommend FIML as the preferred method for handling missing data (Allison 2012). FIML models impute for missing model predictors but not outcomes.

We simplified the models to limit to variables with stronger explanatory power and avoid missing significant associations when related variables in the model were associated with one another. We used the same set of covariates across models (with the relevant fall score used for each outcome) to allow for comparisons.

After estimating in FIML, we tested our findings using multiple imputation and re-estimating the hierarchical linear models using *miAnalyze* with the 20 imputed data sets (Appendix F). These models include imputed outcome variables as well as the imputed covariates. We estimated three models for each outcome. The first model was the unconditional model without any covariates. The second model included covariates for caregiver and PD provider characteristics, such as education, experience, and fall scores, on the outcome of interest. The third model added variables that accounted for different aspects of the WGT experience, such as the dosage indicators for the caregiver and PD provider, and the caregiver report of the helpfulness of the PD provider in increasing the caregiver's effectiveness. The coefficients in the final models and the differences between the variance explained in models 2 and 3 (the change in the R^2) provided estimates of the amount of variance in the outcomes related to participation in WGT.

Outcomes in the analyses included the spring quality of caregiver-child interactions (total Q-CCIIT W-score), spring quality of Support for Social-Emotional Development, Support for Cognitive Development, and Support for Language and Literacy Development (Q-CCIIT domain W-scores), teacher self-efficacy (Teacher Opinion Survey; Geller and Lynch 1999), and teacher beliefs about supporting development (items from the Baby FACES Beliefs about Development scale).

We z-scored all outcomes. For example, we z-scored the spring Q-CCIIT W-scores. Therefore, the coefficients reported represent the change in the outcome in standard deviation units for each one-point increase in the respective variable. In the case of nominal variables, such as "the setting is a toddler classroom," the coefficients represent a difference in the outcome in standard deviation units relative to the reference group.

Covariates examining classroom quality outcomes included in the models were as follows:

- Teacher characteristics: fall score on the outcome of interest, number of weeks between fall and spring observations, education and experience in providing early care and education, and reported psychological distress in the fall (Kessler-6 score)
- Classroom characteristics: class/group size, caregiver:child ratio, and whether the center-based classrooms served primarily infant or toddlers
- Setting type: FCC, EHS center, community-based center

The WGT variables included in the models were as follows:

- Caregiver WGT dosage indicator: the quartile for the number of WGT pages the caregiver opened
- Caregiver's self-reported relationship with PD provider: how much resources and feedback provided by PD provider contributed to the caregiver's professional effectiveness
- PD provider was also the caregiver's supervisor²⁹
- PD provider's dosage indicators: the PD providers who were in the middle or high quartiles of WGT pages opened, the number of training and implementation webinars attended

Our intent in using PD providers in the middle or high quartiles was to reduce variance not meaningful in indicating the PD provider dosage of WGT. Although most PD providers had only one or two caregivers, the number of caregivers a PD provider supported could affect the number of pages they opened. Some PD providers opened and printed handouts and other pages for some of the caregivers, and all PD providers needed to print action planning forms for each caregiver. A PD provider might be opening multiple pages for a single caregiver, one page for each caregiver, or printing information for their own use. After null findings with the indicator for the specific quartile of pages opened, we hypothesized that the variance above the first quartile was related to one of the factors mentioned above rather than to time spent learning about WGT. We further collapsed the distribution to indicate that a PD provider was above the lowest quartile in opening pages on WGT.

We expected implementation webinars to have a low (or negative) association with the outcomes. Most of those PD providers attending the implementation webinars seemed to have less internal support for coaching. All other WGT indicators were expected to be positively associated with the outcomes.

²⁹ Our initial models included PD provider education, but because it was not significant, we trimmed it from the models.

IV. Findings

This chapter details the WGT study findings for each of the following research questions, as delineated in Chapter I:

Research question 1a: Who are the participants in the WGT field test?

Research question 1b: What tools and support help early childhood professionals to use the responsive caregiving principles included in WGT to improve caregiver-child interactions?

Research question 2: Can WGT be used by early childhood professionals to support change in beliefs, knowledge, or practice concerning infants and toddlers?

This study used purposive sampling; therefore, this sample is not nationally representative. For added context, we present relevant descriptive data from the 2012 National Survey of Early Care and Education (see box; NSECE 2013), which provides a description of ECE based on a nationally representative sample of individuals providing direct care and education for children from birth through age 5 and not yet in kindergarten. We do not suggest comparing data points across the studies as we did not test for differences.

Differences reported in the text and tables are statistically significant ($p \leq 0.05$) unless otherwise noted. Appendix B includes the detailed findings for the overall sample of caregivers and PD providers. Appendix C includes tables of estimates by caregiver subgroups.

C. Research question 1a: Who are the participants in the WGT field test?

This section provides information from the caregiver and PD provider background surveys, including caregiver demographics, education and work experience, readiness for change, mental health, and previous experiences with professional development. With the exception of caregiver reports of mental health,³⁰ we conducted tests of significance for all subgroup analyses comparing estimates for center-based and FCC caregivers, and EHS compared with community-based caregivers. Descriptive data are provided for PD provider demographics, education, and work experience. We begin with a brief overview and then provide further details.

The WGT caregiver sample was diverse in race/ethnicity, predominately female, and most reported working full time. About half of the sample had at least an associate's degree. Most WGT caregivers reported being satisfied with their current jobs and ready for change to improve their practice. Before WGT, most caregivers had received a variety of PD activities from the organizations for whom they worked. EHS caregivers reported that their PD needs were assessed using more approaches than were the needs of their community-based counterparts.

More than half of the WGT PD provider sample was White. Their average age was 46.2 years, ranging from 21 to 71 years. Three-quarters of PD providers had attained a bachelor's degree or higher, with early childhood education being a common field of study. Most PD providers were full time, internal coaches in their setting and supervised the caregivers they coached.

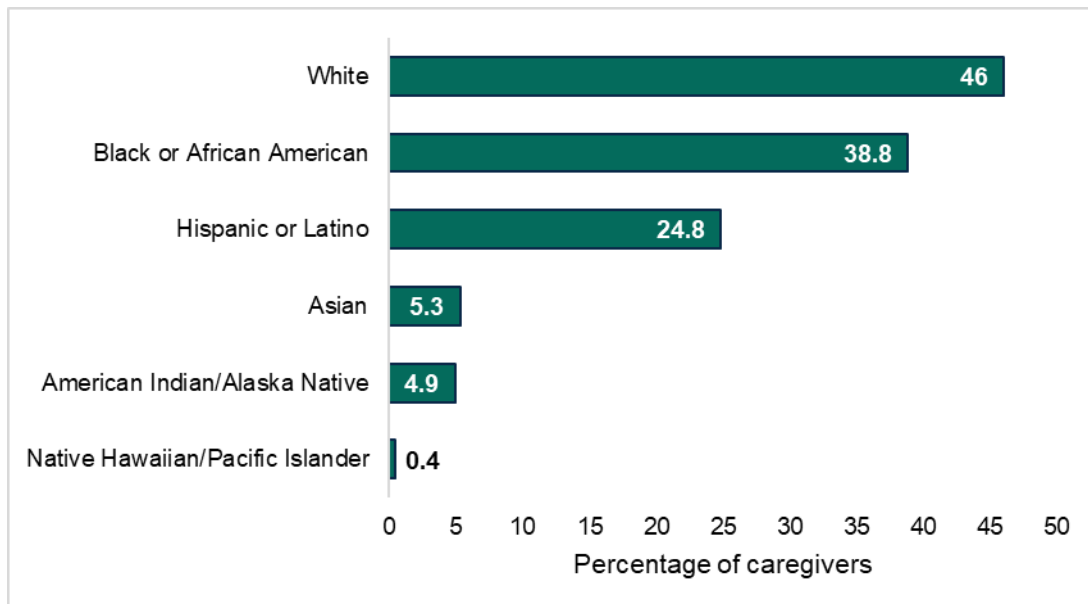
³⁰ Most caregivers reported low levels of anxiety and depressive symptoms.

Caregiver demographics

The fall 2018 WGT sample was diverse in race/ethnicity, with 46 percent White, 38.8 percent Black or African American, 24.8 percent Hispanic or Latino, 5.3 percent Asian, 4.9 percent American Indian/Alaska Native, and 0.4 percent Native Hawaiian/Pacific Islander participants (Exhibit IV.1). A higher percentage of EHS caregivers identified as Hispanic/Latino than their community-based counterparts (31.6 percent and 20.6 percent, respectively). A lower percentage of EHS caregivers identified as White than community-based caregivers (34.7 percent and 53.1 percent, respectively). A lower percentage of center-based caregivers identified as American Indian/Alaska Native than FCC caregivers (3.4 percent and 10.5 percent, respectively). Though this difference is detectable, both percentages represent very few caregivers (fewer than 10). Other race/ethnicity contrasts were not significant (Appendix Tables C.2 and C.16). As context, race/ethnicity data from the National Survey of Early Care and Education (NSECE) 2012 are presented in the box below (Madill et. al. 2018).

WGT participants are not representative of PD providers and caregivers nationally. They agreed to participate in an intensive online PD program for approximately 4 months, with an additional month for PD provider remote training. They were comfortable using written materials in English. Therefore, readers should not draw conclusions about the PD experiences of PD providers and caregivers nationally using these data.

Exhibit IV.1. The WGT sample was diverse in race/ethnicity



Source: Fall 2018 WGT Caregiver Background Survey.

National Estimates of Early Care and Education Workforce

The 2012 National Survey of Early Care and Education (NSECE) is a set of four integrated, nationally representative surveys that describe the ECE landscape in the United States. The following data are drawn from three NSECE surveys. The center-based provider survey is a nationally representative sample of center-based ECE programs serving children not yet in kindergarten. The respondent was typically the center director. The center-based workforce survey is a nationally representative sample of ECE teachers and caregivers, with one randomly selected teacher or caregiver from a randomly selected classroom in a center. The home-based provider survey is a nationally representative sample of individuals who regularly provide care in a home-based setting for children under age 13 who are not their own.

Of center-based ECE caregivers, 65 percent identified as White, 18 percent identified as Black, 2 percent identified as Asian, 2 percent identified as other, and 13 percent identified as Hispanic or Latino. On average, caregivers reported 12.6 years of experience in caring for children ages 0–13. About three-quarters of caregivers (74 percent) reported working full time. Slightly more than half of caregivers had attained at least an associate’s degree (52.5 percent).

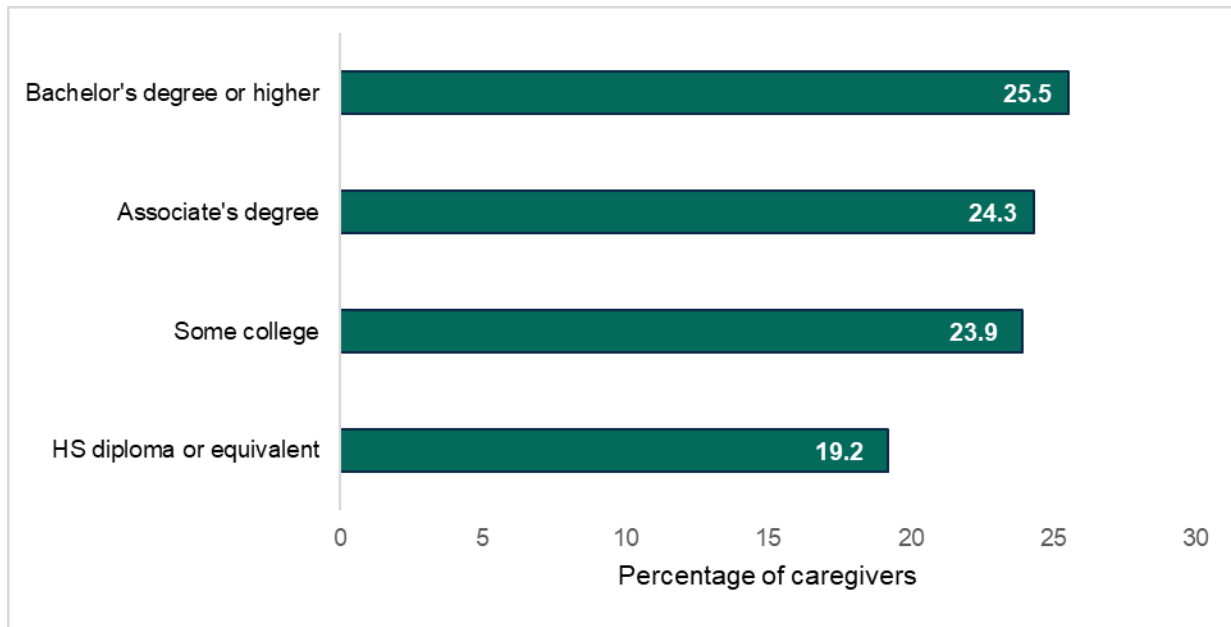
For home-based caregivers, on average, caregivers reported 15.5 years of experience caring for children ages 0–13, and 85 percent reported working full time. About one-third of caregivers had attained at least an associate’s degree (31.4 percent).

About 95 percent of caregivers in the WGT fall 2018 sample reported working full time, with an average of more than 11 years of experience in early care and education. On average, WGT caregivers had 11.2 years of experience in ECE (Appendix Table B.II.1), with center-based caregivers reporting fewer years of experience in ECE than their FCC counterparts (9.9 years and 15.9 years, respectively). About half of caregivers (50.8 percent) reported that a primary caregiver was assigned to each child in their setting. A lower percentage of center-based caregivers reported this situation compared to FCC caregivers (44.4 percent and 73.2 percent, respectively). Other work experience contrasts were not significant (Appendix Tables C.2 and C.16).

The fall 2018 WGT sample was predominantly female, with an average caregiver age of 38.7 years. The range in age was 18 to 73 years. The median age was 36. The fall 2018 WGT caregiver sample was 98.8 percent female (Appendix Table B.II.1). Center-based caregivers, on average, were younger than FCC caregivers (35.9 years and 48.8 years, respectively). Other demographic contrasts were not significant (Appendix Tables C.2 and C.16).

1. Caregiver education and credentials

In the fall, about 50 percent of the WGT caregivers had attained an associate’s degree or higher. About 25 percent of WGT caregivers had attained at least a bachelor’s degree (Exhibit IV.2). For context, educational attainment data from the NSECE 2012 are presented in the box above (NSECE 2013).

Exhibit IV.2. Half of WGT caregivers had received at least an associate's degree

Source: Fall 2018 WGT Caregiver Background Survey.

HS= high school.

Education levels of WGT caregivers differed by caregiver subgroup. A higher percentage of EHS caregivers reported a bachelor's degree as their highest level of education compared to community-based caregivers (27.6 percent and 15.3 percent, respectively). Community-based caregivers were more likely than EHS caregivers to report a high school diploma or equivalent as their highest degree attained (24.8 percent and 10.2 percent, respectively; Appendix Table C.17). Center-based and FCC caregivers reported similar levels of education (Appendix Table C.3).

The most common field of study for WGT caregivers was early childhood education, but the number of courses taken in specific subject areas varied by subgroup. Overall, caregivers reported taking an average of 3.4 to 3.9 college courses in the following areas: (1) infant/toddler development and care, (2) early childhood education, and (3) child development (Appendix Table B.II.2). When examining differences in the average number of courses taken by caregiver subgroup, FCC providers reported taking more courses across all three subjects than their center-based counterparts. On average, FCC caregivers reported one additional course in each area. Similarly, EHS caregivers reported taking at least one additional course in all three subjects than their community-based caregiver counterparts (Appendix Tables C.3 and C.17).

Overall, more than one-third of WGT caregivers reported having a current Child Development Associate (CDA) credential. About 36 percent of WGT caregivers reported having a current CDA (Appendix Table B.II.2). When examining subgroup differences, EHS caregivers were more likely to report having a current CDA credential than community-based caregivers. A greater percentage of FCC caregivers reported having a CDA that was no longer current compared to their center-based counterparts (14 percent and 3.5 percent, respectively). Other contrasts in credentials were not significant (Appendix Tables C.3 and C.17).

2. Caregiver reports of mental health

WGT caregivers reported low levels of depressive and anxiety-related symptoms. Caregivers reported an average score of 5.4 on the CES-D 10, an instrument that measures levels of depressive symptoms (Appendix Table B.II.3). Scores between 10 and 14 are considered “moderate” for depressive symptoms. Less than 9 percent (8.6 percent) of WGT caregivers reported moderate depressive symptoms, and only 2.7 percent reported severe depressive symptoms (a score of 15 or above).

The Kessler-6 Self-Report (K-6; Kessler et al. 2003) measures anxiety and depressive symptoms. On average, WGT caregivers reported low levels of psychological distress on the K-6 (average score of 3.0). Scores between 0 and 6 are considered indicative of “low psychological distress.”

Scores from 7 to 12 are considered as “moderate psychological distress,” and scores greater than or equal to 13 are considered “serious psychological distress.” Slightly more than 1 in every 10 WGT caregivers (10.5 percent) reported moderate symptoms. Additionally, 1.6 percent of WGT caregivers reported having symptoms of serious psychological distress (Appendix Table B.II.3). As context, caregiver mental health reports from the NSECE 2012 are presented in the box (Madill et al. 2018).

NSECE 2012 Caregiver Reports of Mental Health

Center-based ECE caregivers participating in the NSECE 2012, on average, reported low scores of psychological distress on the K-6 (average of 2.6). Less than 8 percent of caregivers (7.69 percent) reported moderate depressive symptoms, and less than 1 percent reported serious depressive symptoms (0.81 percent).

3. Caregivers’ PD experiences before WGT

Most WGT caregivers had received some professional development before the implementation of WGT. Almost three-fourths of caregivers (72.9 percent) reported that they had a mentor, coach, or other PD provider before WGT (Appendix Table B.II.4). A higher percentage of EHS caregivers reported having a mentor, coach, or other PD provider before WGT than did community-based caregivers (81.8 percent and 67.3 percent, respectively). Almost half of all caregivers had worked previously with their WGT PD provider (48.6 percent); on average, they reported having a positive relationship with this provider (mean of 3.8 on a 4-point rating scale). FCC caregivers reported a slightly more positive relationship with their WGT PD provider than did center-based caregivers (mean rating of 3.9 compared to 3.8, out of 4.0), but EHS and community-based caregivers reported similarly positive relationships with their WGT PD provider (Appendix Tables C.4 and C.18).

Within the previous year, caregivers reported receiving training on 40 percent of the TA activity topics focused on teaching strategies and, on average, consulted two websites related to infant and toddler care. On average, caregivers reported receiving training on 2.8 out of 7 TA activity topics focused on teaching strategies (Appendix Table B.II.4). These topics included (1) supporting positive parent-child relationships, (2) supporting teacher-child interactions, (3) supporting a positive classroom environment, (4) engaging parents and families in program activities and children’s learning, (5) supporting early learning in math and science, (6) supporting language and literacy development, and (7) supporting social-emotional development. EHS caregivers reported receiving training on more topics than their community-based counterparts (3.2 compared to 2.5, out of 7), whereas center-based and FCC caregivers both reported receiving training on a similar number of TA topics. Out of a list of professional websites

pertaining to infant and toddler care, caregivers, both overall and by subgroup, accessed approximately 2 out of 11 sites (Appendix Tables C.4 and C.18).

Most WGT caregivers cited classroom observations and being asked directly about their PD needs as the most common methods of PD needs assessment (Appendix Table B.II.6). A higher percentage of EHS caregivers cited the following methods of PD needs assessment than their community-based counterparts: having an individual career or PD plan (61.2 percent compared with 48.4 percent), reviewing classroom observation data (90.2 percent compared with 74.4 percent), reviewing child assessment data (91.3 percent compared with 74.8 percent), and receiving surveys or questionnaires (81.6 percent compared to 57.9 percent). Other contrasts in PD needs assessment were not significant (Appendix Tables C.4 and C.18).

Less than half of WGT caregivers said they were members of a professional organization or network, such as the National Association for Family Child Care (NAFCC) or the National Association for the Education of Young Children (NAEYC; Appendix Table B.II.2). Of caregivers who were members of a professional organization or network (43.9 percent), slightly more than three-quarters (76.9 percent) said they met with a support network of other caregivers. Most of these caregivers (73.2 percent) attended meetings at least once a month (Appendix Table B.II.4). A higher percentage of FCC caregivers (92.9 percent) reported that they met with such a support network compared with center-based caregivers (71.3 percent). Other contrasts in involvement in professional organizations or networks were not significant (Appendix Tables C.4 and C.18).

WGT caregivers' organizations provided a variety of PD activities. The most commonly reported activities overall were (1) professional organization meetings, (2) paid time during work hours for staff development, and (3) paid preparation/planning time (Appendix Table B.II.4). A higher percentage of center-based caregivers reported receiving paid preparation/planning time (73.3 percent) and paid time during work hours for staff development (74.0 percent), than their FCC counterparts (45.2 and 43.2 percent, respectively). A higher percentage of FCC caregivers reported participating in a support network of other caregivers than did center-based caregivers (92.9 and 71.3 percent, respectively). A higher percentage of EHS caregivers reported receiving paid preparation/planning time (81.6 percent); paid time during work hours for staff development (81.5 percent); ongoing consultation from a specialist, coach, or mentor (78.4 percent); and opportunities to visit other child care classrooms or settings (52.5 percent) compared with their community-based counterparts (59.3, 59.7, 49.6, and 32.8 percent, respectively). Other subgroup contrasts in PD opportunities were not significant (Appendix Tables C.4 and C.18).

4. Caregiver satisfaction with work and openness to change

Most WGT caregivers reported they were very likely to continue working in infant/toddler care. Overall, 84.4 percent of caregivers expressed their plans to continue working in infant/toddler care (Appendix Table B.II.5). Almost all caregivers in FCCs reported this outcome as “very likely” (98.2 percent) compared with a smaller percentage of center-based caregivers (80.6 percent). Most center-based and FCC caregivers reported their five-year career goal included working at their current workplace or job (65.5 percent and 76.8 percent, respectively). However, a higher percentage of FCC caregivers reported that they wanted to keep their current job than center-based caregivers (71.4 percent and 47.3 percent, respectively). A higher percentage of center-based caregivers reported that they wanted a different position in the same workplace (18.2 percent and 5.4 percent, respectively). Other career and caregiving goals were similar across groups (Appendix Tables C.5 and C.19). Notably, caregivers across

subgroups gave similar endorsements to the caregiving goals of keeping infants and toddlers safe, healthy, and happy, and helping them grow in all areas of development.

Most WGT caregivers reported being open to change or actively engaged in change to improve their practice. The Stage of Change measure (Peterson et al. 2010) provided information about WGT caregivers' readiness for change and openness to continuous improvement. Higher stages of change indicate greater openness to improvement. In fall 2018, most caregivers (91.6 percent; Appendix Table B.II.5) identified as being in Stage 3 (ready to change) or Stage 4 (actively engaged in change). A higher percentage of FCC caregivers endorsed the Stage 4 indicators compared with center-based caregivers (63.6 percent and 41 percent, respectively). A higher percentage of center-based caregivers were in Stage 3 compared with FCC caregivers (49.7 percent and 30.9 percent, respectively; Appendix Table C.5). The stage of change was similar between EHS and community-based caregivers (Appendix Table C.19).

5. Caregiver report on curriculum use

Most WGT caregivers across all setting types reported that Creative Curriculum was their primary curriculum. Overall, about 60 percent of caregivers reported using Creative Curriculum as their primary curriculum, followed by Active Learning for Infants (24.3 percent; Appendix Table B.II.7). All subgroups reported Creative Curriculum as the most commonly used primary curriculum in their setting (Appendix Tables C.6 and C.20).

6. PD provider demographics

More than half of WGT PD providers were White. More than half (55.4 percent) of the PD providers identified as White. About one-third of them identified as Black or African American (30.7 percent), 4.2 percent as Asian, 4.2 percent as American Indian or Alaska Native, and 3 percent as Native Hawaiian or Pacific Islander. Less than one-fifth (18.4 percent) of PD providers identified as Hispanic or Latino (Appendix Table B.II.9).

WGT PD providers were predominately female, with an average age of 46. Almost all PD providers were female (97.6 percent). The average age of PD provider was 46.2, with a range in age from 21 to 71 years³¹ (Appendix Table B.II.9).

Most PD providers were full-time internal coaches in their setting and supervised the caregivers they coached. More than half (57.1 percent) of PD providers reported full-time work status. Most of the them were internal coaches in their setting (59.2 percent internal coaches compared to 29.9 external coaches). More than 6 in every 10 caregivers (63 percent) identified their WGT PD provider as also being their supervisor. On average, WGT PD providers reported working with 13–14 caregivers on an ongoing basis (Appendix Table B.II.9).

7. PD provider education and credentials

About three-quarters of PD providers had attained a bachelor's degree or higher, with early childhood education being a common field of study. Half of all PD providers (50.3 percent) reported a bachelor's degree as the highest degree earned. An additional 25.5 percent of caregivers had attained a master's degree or higher. Early childhood education was most commonly cited as the field of providers' highest degree (42.8 percent). With these higher education levels, only 19.5 percent of PD providers had a current

³¹ The median age of PD providers was 47.

CDA credential. More than half (56.5 percent) of PD providers reported belonging to a professional organization such as NAEYC or NAFCC (Appendix Table B.II.10).

8. PD provider work experiences

For most WGT PD providers, their program/center funded their position. About three of every five PD providers (59.2 percent) reported their position was funded by their program/center (Appendix Table B.II.11). Almost 1 in 4 (24 percent) of PD providers reported that they worked for an organization funded to provide free PD to early childhood programs. The remainder were hired as independent contractors (5.1 percent), worked for an organization paid to provide PD (1.3 percent), or reported another source of funding (10.8 percent).

Most WGT PD providers received supervision and were members of a PD provider support network. About two-thirds (65.2 percent) of WGT PD providers reported that they had received a form of reflective supervision within the last year. Almost three-fourths of PD providers (74.4 percent) reported membership in a PD provider support network, with 68.9 percent of these providers attending support-network meetings at least once a month (Appendix Table B.II.11).

D. Research question 1b: What tools and support help early childhood professionals to use the responsive caregiving principles included in WGT to improve caregiver-child interactions?

This section provides information from the caregiver and PD provider feedback surveys about the support received during implementation, satisfaction with tools and resources used, and challenges to WGT implementation encountered by the caregivers and PD providers. When comparing subgroup estimates for center-based and FCC caregivers or EHS and community-based caregivers, we conducted tests of significance of differences.

Based on the fall observation, the Language Use module was recommended for the majority of caregivers as one of three recommended modules. It was also the module most often used by caregivers and PD providers. Few caregivers (less than 5 percent of the sample across both modules) reported spending “the most time” in the infant or toddler Cognitive Development modules.

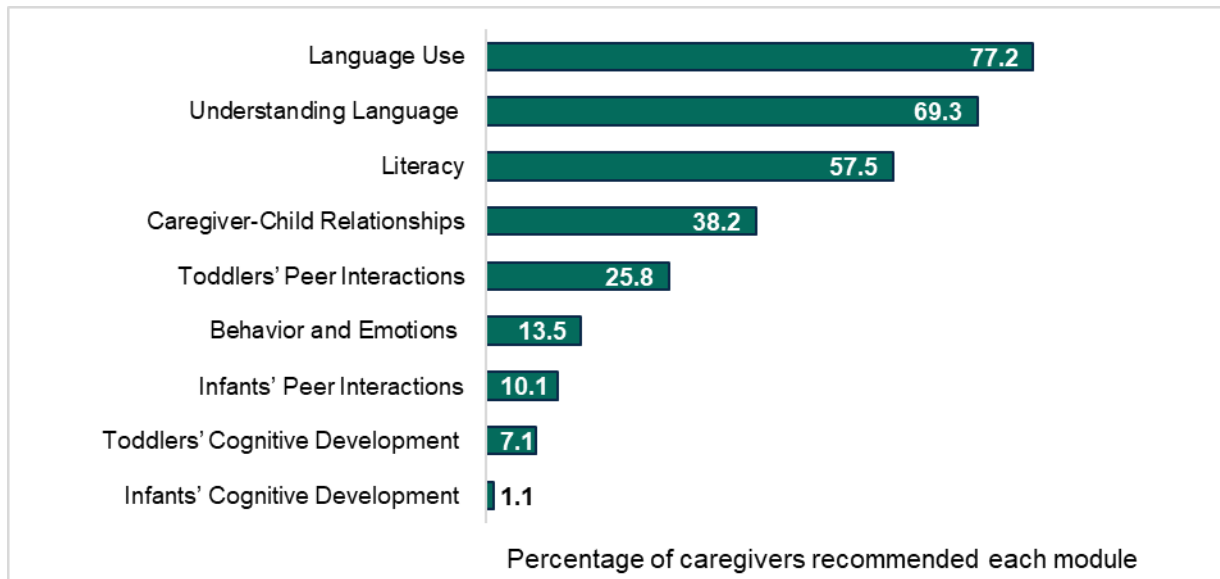
Overall, caregivers reported having a positive experience with WGT. Both caregivers and PD providers reported that they found WGT activities and tools to be useful. Caregivers also reported having positive relationships with their WGT PD providers and feeling supported by their leadership and peers during WGT implementation. Time demand was the most frequently cited challenge faced during WGT implementation by caregivers and PD providers.

1. Recommended modules and reported use

Caregivers who participated in WGT were presented with three recommended learning modules based on their strengths and need for further development on the Q-CCIIT observation. Of the nine available modules, the three most frequently recommended pertained to language and literacy: (1) Support for Children’s Language Use, (2) Support for Children’s Understanding of Language, and (3) Support for Children’s Literacy (Exhibit IV.3). These same modules were recommended most frequently across all subgroups as well.

Consistent with adult learning theory and the importance of learner choice, the pairs of caregivers and PD providers collaboratively selected the first module from the set of recommended modules and were encouraged to select the key practices on which they wanted to work within that module. Once the pairs decided to move on to a new key practice, they could select another within the same module or move to a new module. In the feedback survey, caregivers reported about the module in which they spent the most time working.

Exhibit IV.3. The Language Use module was most frequently recommended to WGT caregivers



Source: Spring 2019 WGT Caregiver and PD Provider Feedback Surveys.

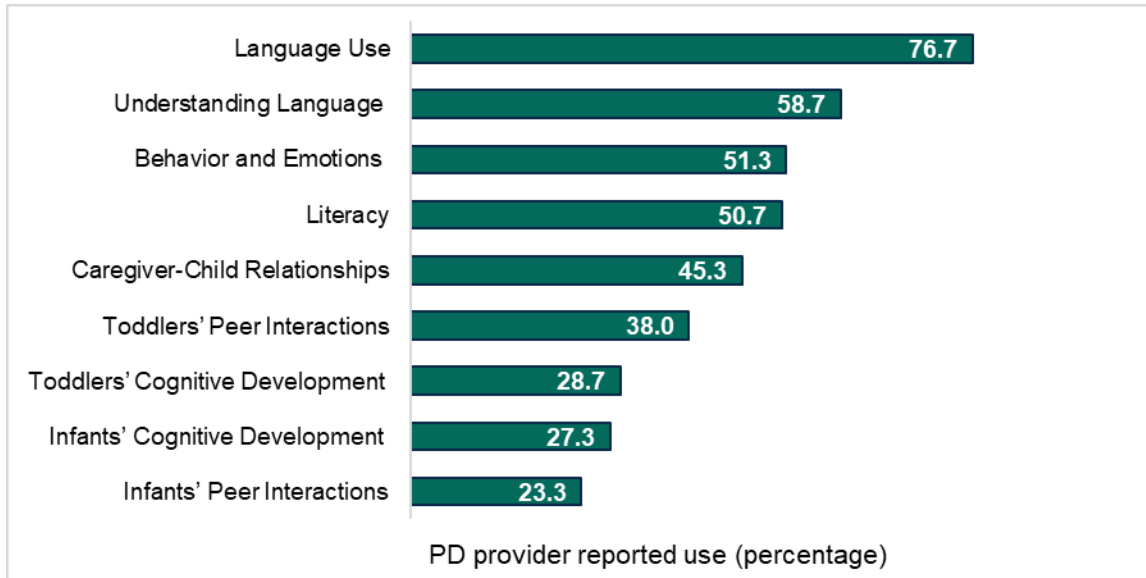
Note: Three modules were recommended to each caregiver based on scores on the positive Q-CCIIT scales, but PD providers were given permission to introduce other modules' key practices as needed, based on their observations. Caregivers collaboratively selected practices within modules and created goals with the PD providers.

PD providers most commonly reported using the Language Use module at some point during WGT.

Most PD providers reported using Language Use (76.7 percent), followed by the Understanding Language (58.7 percent), Support for Children's Behavior and Emotions (51.3 percent), and Literacy (50.7 percent) modules with their paired caregivers (Exhibit IV.4). During training, we encouraged PD providers also to use their own ongoing observations of caregivers to inform discussions about goals with them.

More than half of the WGT caregivers reported that they spent most of their time in the Language Use or Behavior and Emotions modules (Exhibit IV.5). Nearly one-third of the caregivers spent most of their time in Language Use (32.9 percent) and nearly one-quarter spent it in Behavior and Emotions (22.1 percent). Although more than half of PD providers said they used the Understanding Language (58.7 percent) and Literacy (50.7 percent) module with caregivers (Appendix Table B.III.1), fewer caregivers (10.4 percent) reported spending most of their time in those modules.

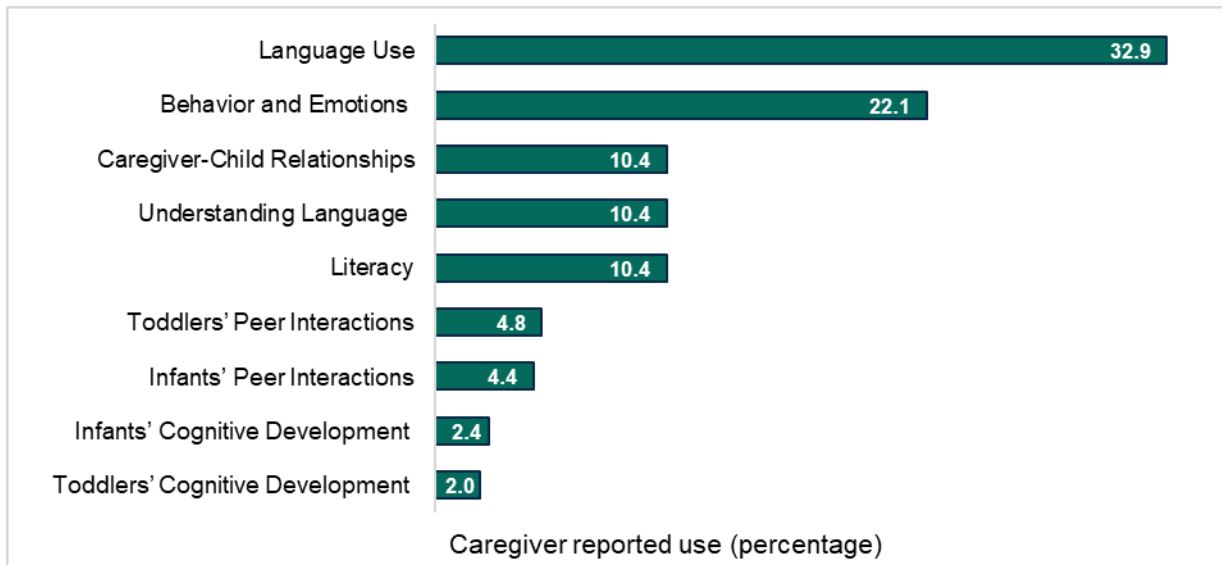
Exhibit IV.4. PD providers most commonly reported using the Language Use module with caregivers



Source: Spring 2019 WGT Caregiver and PD Provider Feedback Surveys.

Note: Three modules were recommended to each caregiver based on scores on the positive Q-CCIIT scales, but PD providers were given permission to introduce other modules' key practices as needed, based on their observations. Caregivers collaboratively selected practices within modules and created goals with the PD providers.

Exhibit IV.5. WGT caregivers reported most frequent use of the Language Use and Behavior and Emotions modules

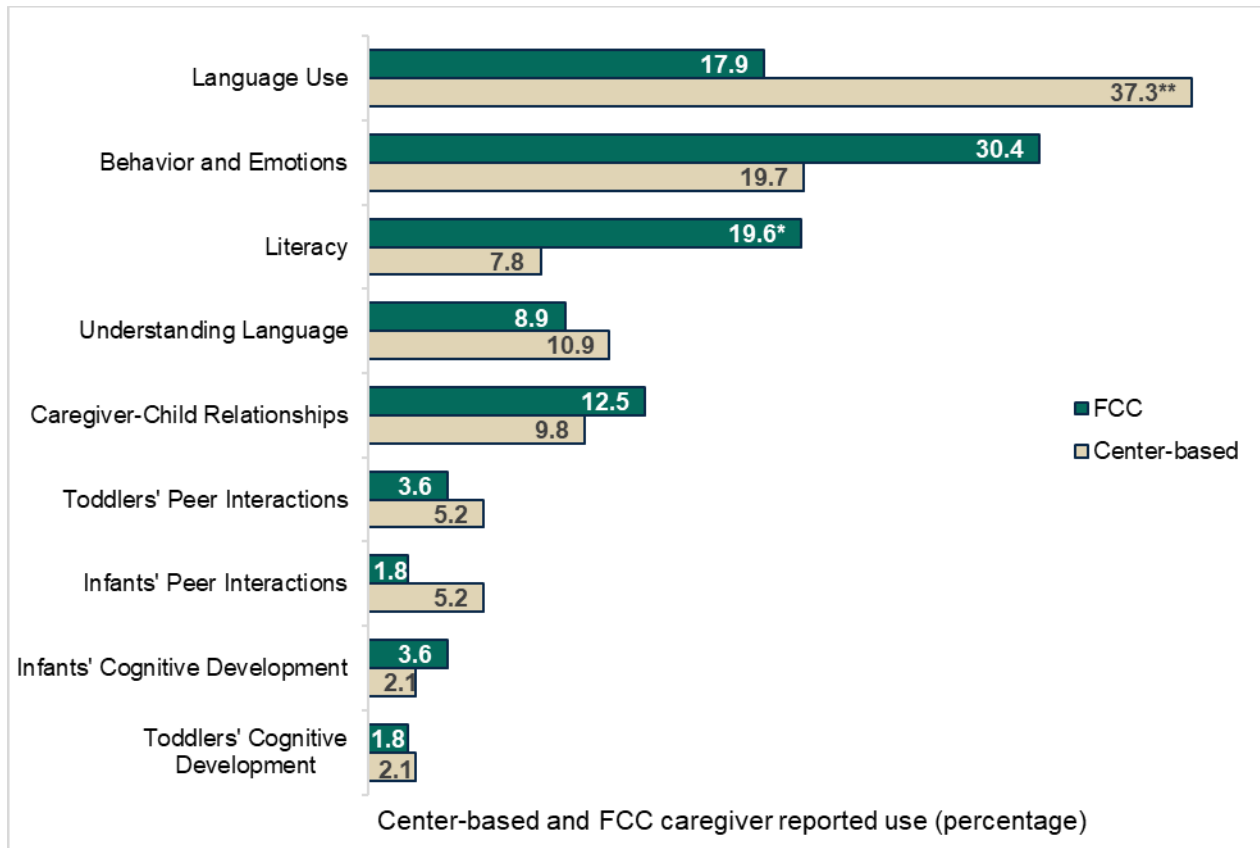


Source: Spring 2019 WGT Caregiver and PD Provider Feedback Surveys.

Note: Three modules were recommended to each caregiver based on scores on the positive Q-CCIIT scales, but PD providers were given permission to introduce other modules' key practices as needed, based on their observations. Caregivers collaboratively selected practices within modules and created goals with the PD providers.

Caregivers in center-based settings were more likely to report spending the most time in the Language Use module compared with FCC caregivers (Exhibit IV.6). More than one-third of caregivers in center-based settings (37.3 percent) spent the most time in the Language Use module compared with 17.9 percent of FCC caregivers. FCC caregivers were more likely than center-based caregivers to report time in the Literacy module (19.6 percent versus 7.8 percent). Community-based caregivers were more likely to report spending most of their time in the Behavior and Emotions module (27.6 percent) compared with EHS caregivers (13.4 percent) (Exhibit IV.7). Other contrasts in module use were not significant.

Exhibit IV.6. Center-based caregivers were more likely than those in FCCs to spend the most time in the Language Use module but less likely to spend the most time in the Literacy module

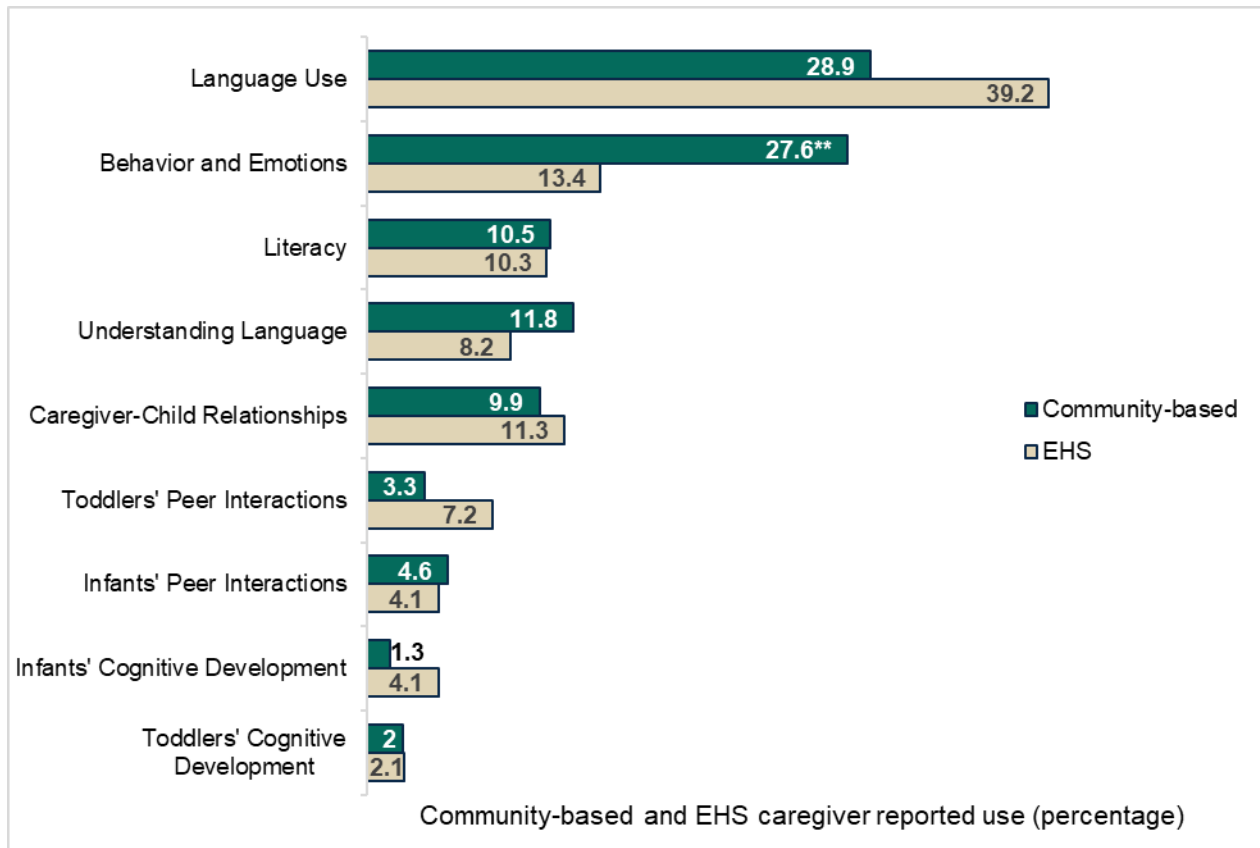


Source: Spring 2019 WGT Caregiver Feedback Surveys.

Note: Three modules were recommended to each caregiver based on scores on the positive Q-CCIIT scales, but PD providers were given permission to introduce other modules' key practices as needed, based on their observations. Caregivers collaboratively selected practices within modules and created goals with the PD providers.

* Indicates a significant difference between percentages of caregivers in center-based and FCC classrooms (*p ≤ 0.05; **p < 0.01; ***p < 0.001).

Exhibit IV.7. Community-based caregivers were more likely than those in EHS to spend the most time in the Behavior and Emotions module



Source: Spring 2019 WGT Caregiver Feedback Surveys.

Note: Three modules were recommended to each caregiver based on scores on the positive Q-CCIIT scales, but PD providers were given permission to introduce other modules' key practices as needed, based on their observations. Caregivers collaboratively selected practices within modules and created goals with the PD providers.

* Indicates a significant difference between percentages of caregivers in each group (* $p \leq 0.05$; ** $p < 0.01$; *** $p < 0.001$; ~ $p < 0.10$).

2. Caregiver use of implementation supports and perception of WGT implementation

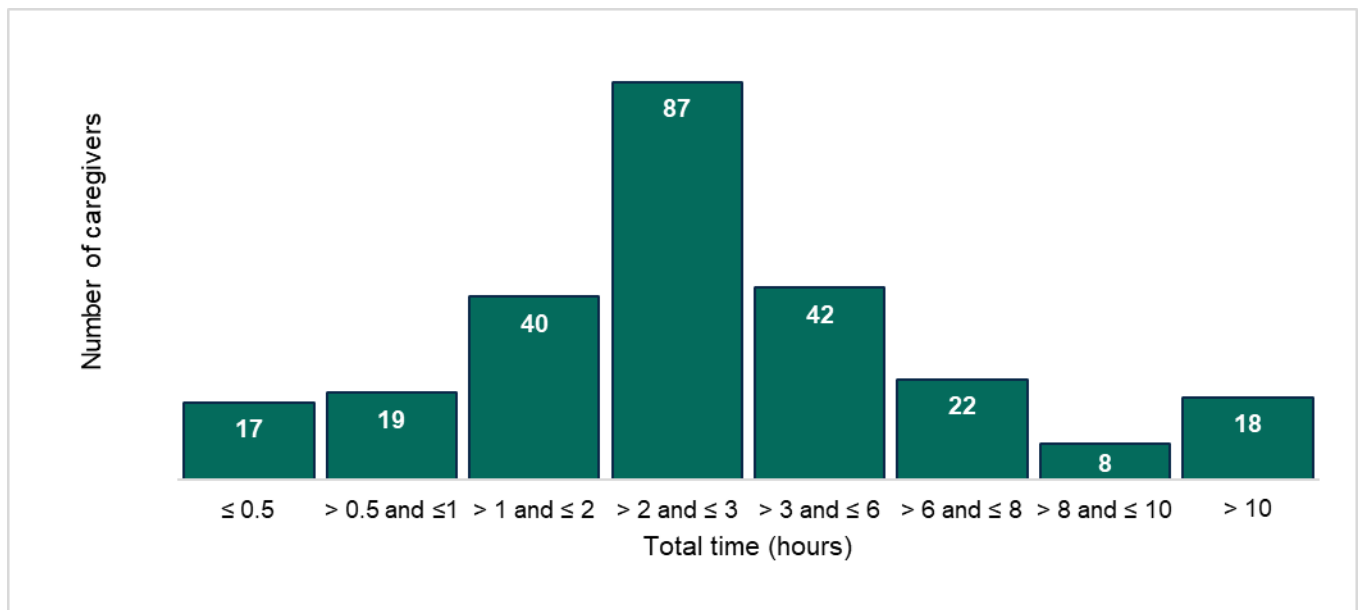
Caregivers used a variety of options in engaging with the technological components of WGT.

Caregivers reported accessing the WGT website in varied settings using different types of devices and sources of Internet access (Appendix Table B.V.3). Nearly half of the caregivers accessed the WGT website mostly at work (45.7 percent) and the other half mostly at home (46.2 percent). Most caregivers (74.7 percent) reported using the iPad tablets provided by the study to access the WGT website. Although the study also provided cellular Internet access through the tablets, only 30.9 percent of caregivers reported using cellular service as one of the ways they accessed the WGT website, whereas 81.1 percent of caregivers used Wi-Fi. More than 1 in 10 (14.1 percent) of the caregivers reported they did not have reliable access to a computer or Internet connection (Appendix Table B.V.7). Based on information from the help desk and live webinars, some caregivers may not have had access to their iPad tablets while working with children in their settings.

Caregivers reported satisfaction in using the WGT website. On average, caregivers reported satisfaction with various elements of the WGT website (mean rating of 5.2 out of 6.0³²; Appendix Table B.V.3). By the end of the study, most caregivers reported that when they were on the WGT website, it was easy to learn to use (97.2 percent), easy to use (96.0 percent), and easy to find the information they needed (98.8 percent).

Caregivers spent limited time on the WGT website. The website analytics indicated that caregivers spent an average of 9.0 minutes per week and an average total of 3.9 hours on the WGT website over the course of the study (Exhibit IV.8). However, caregivers may also have accessed the WGT website content via their PD provider, peer caregiver’s accounts, or printed WGT materials.

Exhibit IV.8. Caregivers who logged onto the WGT website spent an average of 3.9 hours on it over the course of the program



Source: WGT Web user tracking data.

Notes: Represents web usage between November 3, 2018, and April 30, 2019, of the 253 caregivers in the analytic sample who logged onto the WGT website. The web usage tracking data recorded the time the primary web page was open (a proxy for use of the website).

Caregivers also spent time reviewing recommended materials outside of the WGT website.

Caregivers reviewed materials such as those linked on the Additional Resources sections (Note: time spent on external websites is not included in the web usage tracking data). Of the 90 percent of caregivers who accessed a website recommended in the Additional Resources sections, nearly all (96.3 percent) reported on the feedback survey that they plan to use one or more of these websites again. They most commonly reported plans to use the ZERO TO THREE, the Center on the Social and Emotional Foundations for Early Learning (CSEFEL), and the Center for Early Literacy Learning websites again (Appendix Table B.V.4).

³² Caregiver ratings were on a scale of 1 (Strongly disagree), 2 (Disagree), 3 (Slightly disagree), 4 (Slightly agree), 5 (Agree), and 6 (Strongly agree).

Nearly all caregivers (92.6 percent) attempted to video-record themselves in the classroom using the iPad tablet provided by the study. We recommended that caregivers record themselves once a week in the classroom to reflect on their practice. To support implementation of this strategy, we provided tripods for the iPads and guidance on obtaining permissions and maintaining privacy. Most caregivers (72 percent) reported that it was easy or very easy to use the tablets to video-record themselves (Appendix Table B.V.3).

On average, center-based caregivers agreed that leadership and peers in their settings provided support during WGT implementation. They agreed (mean rating of 4.8³³) that their setting leaders helped them to be their best and look for information or experts who could help improve their work with children and made them feel comfortable talking about problems in caring for the infants and toddlers (Appendix Table B.V.1). They also agreed that they felt supported by their peers (mean rating of 4.9) and most caregivers strongly agreed that their peers focused on providing the best care possible (mean rating of 5.4) and shared and talked about the best ways to meet the needs of children (mean rating of 5.3; Appendix Table B.V.2).

Caregivers reported challenges finding time to participate in WGT activities, given their already busy schedules and job responsibilities. Even though most caregivers (68.2 percent; Appendix Table B.II.4)) reported having paid time during work hours for staff development, the majority agreed they did not have enough time to use the online WGT materials (56.3 percent; Exhibit IV.9).

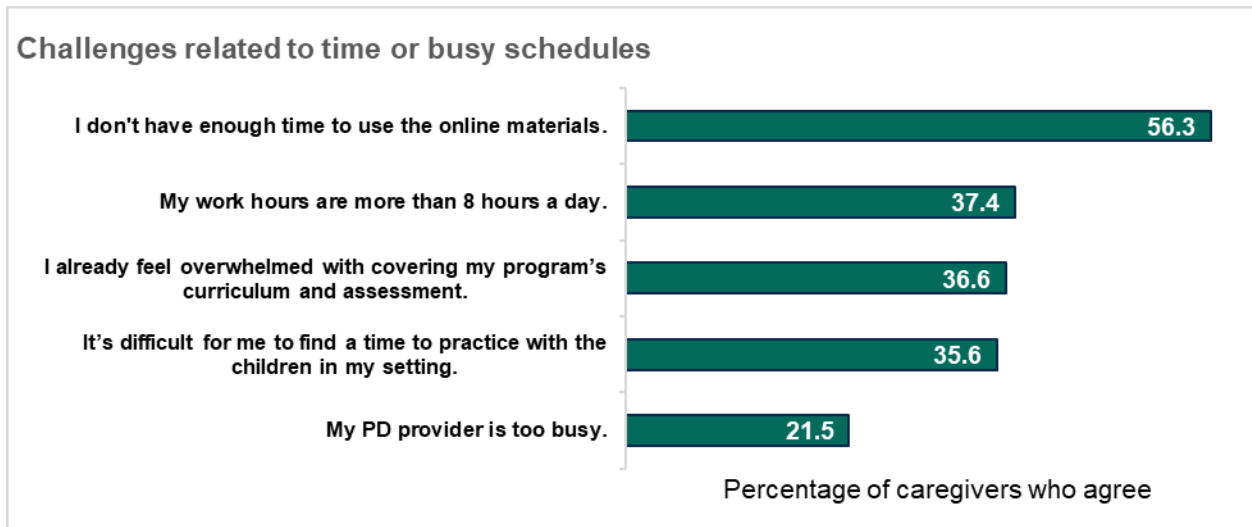
Of the list of potential challenges to participation in professional development, time demand was the most commonly reported. Some caregivers (37.4 percent) felt challenged by working long days (more than eight hours a day) or overwhelmed with implementing their program's curriculum and assessments (36.6 percent; Exhibit IV.9). Caregivers in FCCs were much more likely than those in center-based settings to cite working more than eight hours a day as a reason why participating in PD activities like WGT was difficult (74.5 percent compared with 26.7 percent). Community-based caregivers were also more likely to report working more than eight hours a day compared with their EHS counterparts (44.7 percent compared with 26 percent). On average, caregivers reported spending 25.6 hours on other PD activities outside of WGT during the study period.³⁴

More FCC caregivers reported lack of support from their family as a challenge compared to center-based caregivers (19.6 percent compared with 6.8 percent). Other challenges were similar across subgroups (Appendix Tables C.8 and C.22).

³³ Caregiver ratings were on a scale of 1 (Strongly disagree), 2 (Disagree), 3 (Slightly disagree), 4 (Slightly agree), 5 (Agree), and 6 (Strongly agree).

³⁴ Feedback survey question asked caregivers for the time they spent on PD, training, or TA activities outside of WGT since December 2018.

Exhibit IV.9. Caregivers most commonly reported challenges in having enough time to participate in WGT activities



Source: Spring 2019 WGT Caregiver Feedback Survey.

Caregivers reported building positive and trusting relationships with their PD providers. On a 4-point scale of how frequently the statement is true,³⁵ caregivers reported it was usually true that their PD provider was someone who showed them respect (mean rating 3.9), whom they trusted (mean rating 3.8), and with whom they felt comfortable asking questions regarding things about which they were unsure (mean rating 3.8; Appendix Table B.VI.3).

Caregivers most commonly reported agreeing³⁶ that they worked collaboratively with their PD provider to set goals (mean rating 4.9) or set goals by themselves (mean rating 4.4) as opposed to using goals from their center director (mean rating 2.9). They most commonly reported their goals were almost always³⁷ individualized to their experience or needs (mean rating 4.1). Fewer caregivers reported always using a goal-setting framework, such as SMART goals, as recommended by the study team, to guide goal setting (mean rating 3.6 out of 5.0; Appendix Table B.V.6).

Most caregivers (67.4 percent) met with their PD provider more than once a month (including in-person and virtual meetings). Caregivers reported communicating with their PD provider most frequently in person (89.2 percent), followed by via email (39.0 percent), phone calls (33.3 percent), and text (26.5 percent; Appendix Table B.V.5). Caregivers who responded to the monthly pop-up surveys gave similar responses based on their communication with PD providers for a given month. Most caregivers reported they did not face communication challenges related to language or culture (87.1 percent did not have difficulty) when communicating with their PD provider (Appendix Table B.V.7).

On average, caregivers who tried a WGT activity reported that activity to be useful (mean ratings between 3.9 and 4.4, on a 5-point scale; Exhibit IV.10). Although some activities were recommended,

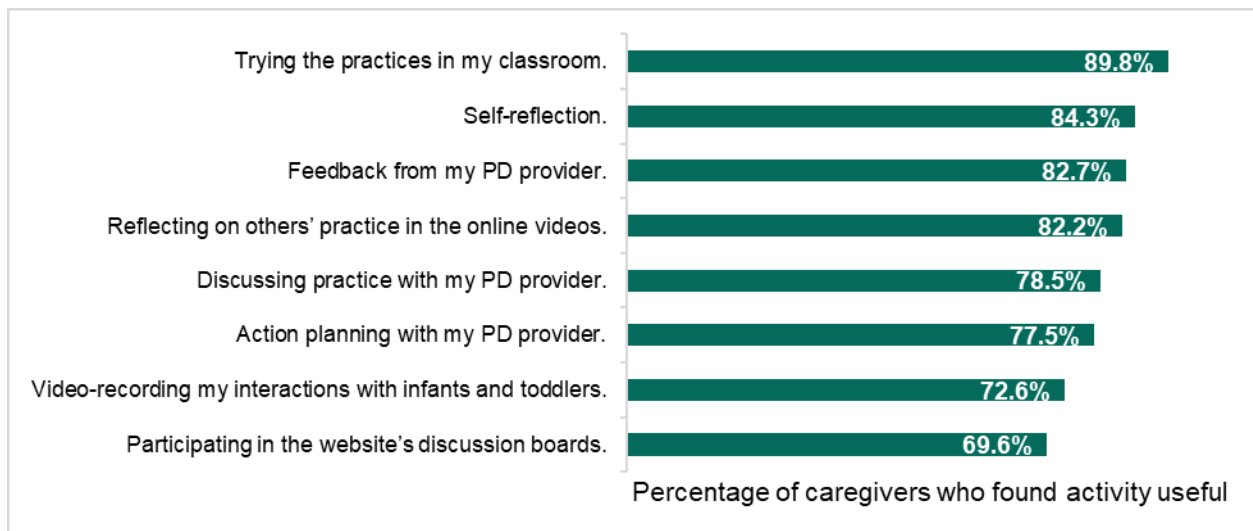
³⁵ Caregiver ratings were on a scale of 1 (Never true), 2 (Rarely true), 3 (Sometimes true), and 4 (Usually true).

³⁶ Caregiver ratings were on a scale of 1 (Strongly disagree), 2 (Disagree), 3 (Slightly disagree), 4 (Slightly agree), 5 (Agree), and 6 (Strongly agree).

³⁷ Caregiver ratings were on a scale of 1 (Never), 2 (Rarely), 3 (Sometimes), 4 (Almost always), and 5 (Always).

WGT provided a choice in tools and activities to support learning. The feedback survey asked the caregivers and PD providers to report about the usefulness of the implementation activities and tools they tried. Between 54.6 and 90.4 percent of caregivers reported trying a given WGT activity. The top three WGT activities that caregivers across different settings found useful were trying WGT caregiving practices in their classroom (4.4, n = 245), receiving feedback from their PD provider (4.3, n = 231) and engaging in self-reflection (4.2, n = 235). Caregivers found participating in WGT website discussion boards to be less useful (3.9, n = 148; Appendix Table B.VI.1). Caregivers in different settings rated WGT activities as similarly useful, with one exception. Community-based caregivers were more likely than EHS caregivers to report that action planning with their PD provider was a useful activity (4.2, n = 141 vs. 4.0, n = 94; Appendix Tables C.9 and C.24).

Exhibit IV.10. Caregivers’ perceptions of usefulness of the WGT activities



On average, caregivers who tried a WGT tool reported that tool to be useful (mean ratings between 4.1 and 4.4 on a 5-point scale).³⁸ Most caregivers reported using both the recommended and additional types of tools on the WGT website. More than 80 percent of caregivers used each of the recommended tools that were available and presented prominently on the web page for each key practice. Using a 5-point scale, from 233 to 247 caregivers gave ratings for the recommended tools that averaged between useful and very useful: presentations with voice-over (4.3, n = 236), questions for self-reflection with (4.2, n = 233) and without self-video (4.1, n = 238), summary handouts (4.4, n = 247), and step-by-step guides (4.4, n = 240). Of the additional tools, caregivers most commonly used handouts for families (4.2, n = 238) and caregiver self-assessment checklists (4.3, n = 237). Not all additional tools were available for every key practice in each module (Appendix Table B.VI.2).

Of the caregivers who spent the most time in each module, the majority reported the content of those modules to be useful for helping their work (mean rating for each module ranged between 3.2 and 3.6 on a 4-point scale;³⁹ Appendix Table B.VI.4). FCC caregivers were more likely to report the Literacy module to be useful for their work compared with center-based caregivers (3.7 and 3.2, respectively).

³⁸ Caregiver ratings were on a scale of 1 (Not useful at all) 2 (Not very useful) 3 (Somewhat useful) 4 (Useful), and 5 (Very useful).

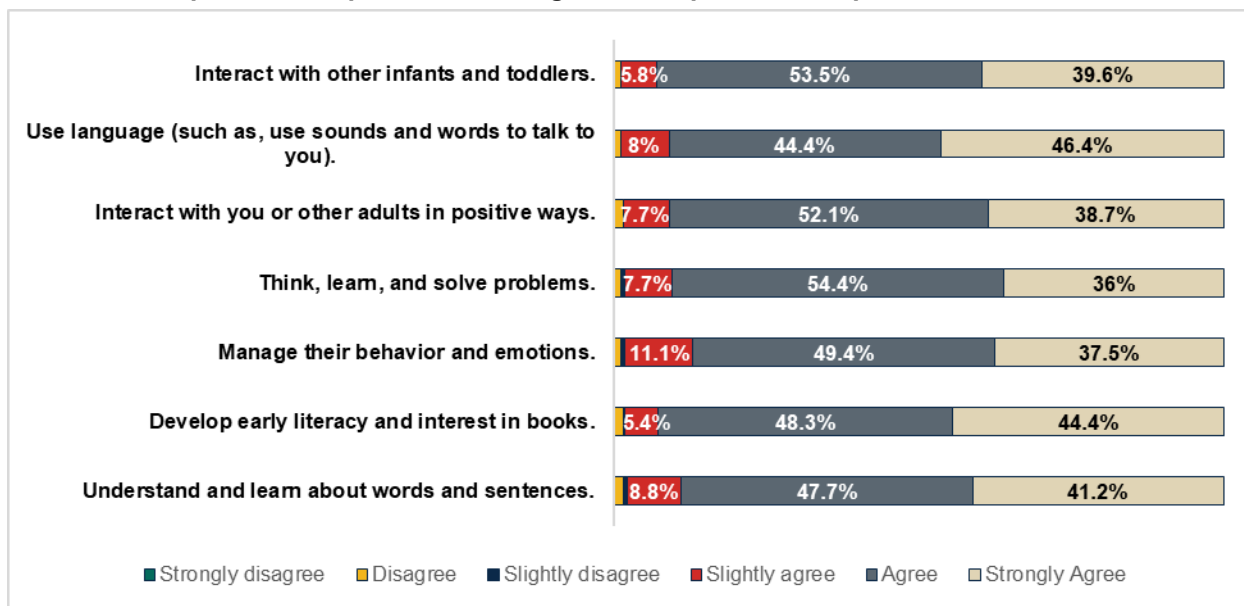
³⁹ Caregiver ratings were on a scale of 1 (Not useful), 2 (A little useful), 3 (Useful), and 4 (Very useful).

Community-based caregivers were more likely to report the Caregiver-Child Relationships module to be useful for their work compared with EHS caregivers (3.8 and 3.4, respectively). Ratings of usefulness for other modules were similar across subgroups (Appendix Tables C.11 and C.25).

More than 91 percent of caregivers overall and across different settings reported they had a positive experience with WGT. Caregivers most commonly agreed that WGT provided useful resources and helped them become effective in interacting with children (99.6 percent and 98.4 percent, respectively; Appendix Table B.VI.7). Other contrasts in this analysis were not significant (Appendix Tables C.7 and C.21).

Nearly all caregivers reported that using the WGT practices helped infants and toddlers. This finding was true across settings and different WGT practices (Appendix Tables B.VI.6, C.12, and C.26). More than 98 percent of caregivers reported that using the WGT practices helped infants and toddlers (with a mean agreement rating of 5.3 on a 6-point scale).⁴⁰ They agreed most strongly that WGT practices helped children in language and literacy (98.4 and 98.8 percent, respectively). The two items rated most positively were about helping children develop early literacy and interest in books and use of language (such as use sounds and words to talk; Exhibit IV.11).

Exhibit IV.11. More than 98 percent of caregivers, overall and across different settings and different WGT practices, reported that using the WGT practices helped infants and toddlers



Source: Spring 2019 WGT Caregiver Feedback Surveys.

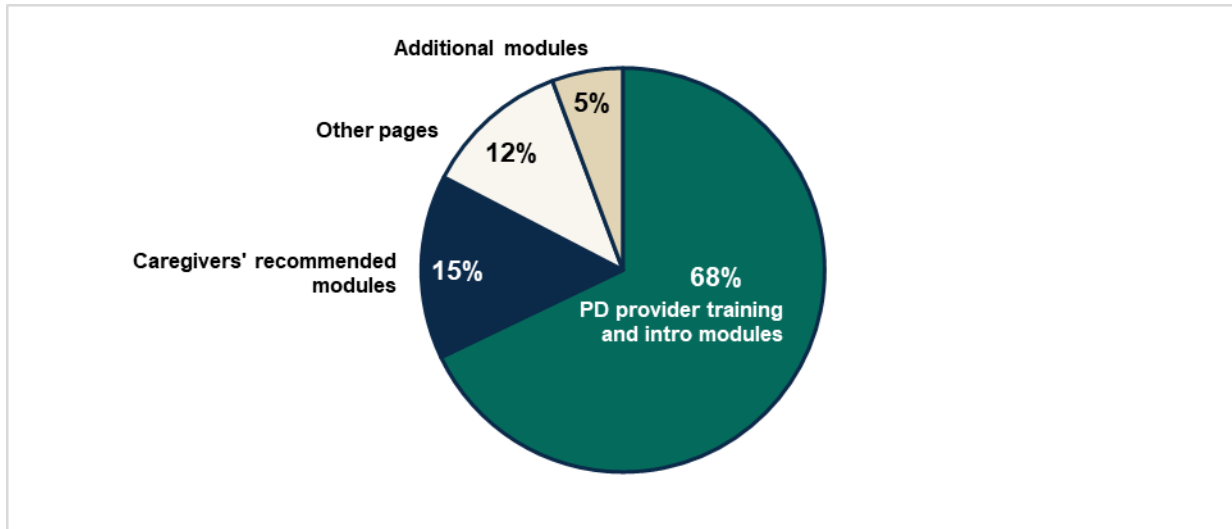
3. PD providers’ perceptions about WGT supports and implementation

PD providers spent most of their time on the WGT website accessing the PD provider materials related to coaching and coaching practices, followed by key practice materials in the caregiver modules (Exhibit IV.12). Nearly all PD providers accessed the WGT website during the PD provider training period (85.7 percent) and first two months of implementation (93.5 percent). PD providers spent an average monthly

⁴⁰ Caregiver ratings were on a scale of 1 (Strongly disagree), 2 (Disagree), 3 (Slightly disagree), 4 (Slightly agree), 5 (Agree), and 6 (Strongly agree).

time of 65.3 minutes during the PD provider training period and 35.3 minutes during the first two months of implementation on the PD provider training and introductory modules, which contained PD provider-specific tools and coaching resources (for example, the action plan template and PD provider discussion boards). They spent an average monthly time of 13.8 and 5.0 minutes, respectively, on their caregivers' recommended modules and additional modules during the first two months of implementation.

Exhibit IV.12. PD providers spent the most time reviewing coaching materials on the WGT website



Source: WGT Web user tracking data.

Note: Data represent total average time spent by PD providers between November 3, 2018, and April 30, 2019. The web user tracking data tracked the time that the primary web page was open (a proxy for use of the website); see Chapter II, Section E for more details on participant web usage.

Most PD providers who tried WGT coaching activities reported being satisfied with those activities (mean ratings between 3.7 and 4.4 on a 5-point scale; Appendix Table B.VI.8).⁴¹ More than 94 percent of PD providers reported using action planning and review, and guiding caregivers to additional resources (96.7 percent and 94.7 percent, respectively). Most PD providers who used these activities reported satisfaction with them (4.2, n = 145 and, 4.1, n = 142, respectively). Of those who tried an activity, PD providers reported greatest satisfaction with observing caregiver practices through video or in-person (4.4, n = 135) and discussing things they noticed from observations with caregiver(s) (4.3, n = 139).

In the feedback survey, most PD providers reported being satisfied by all of the PD provider resources that they tried (mean ratings between 5.0 and 5.2 on 6-point scale).⁴² PD providers reported greatest satisfaction (mean rating of 5.2) with coaching practice recommendations (n = 133), SMART goals guidelines (n = 137), ideas for getting to know the caregiver (n = 127), the action plan template (n = 131), and mindfulness/meditation resources (n = 103; Appendix Table B.VI.8).

⁴¹ PD providers ratings were on a scale of 1 (Not At All Helpful) 2 (Not Very Helpful) 3 (Somewhat Helpful) 4 (Helpful) 5 (Very Helpful).

⁴² PD providers ratings were on a scale of 1 (Very Unsatisfied) 2 (Unsatisfied) 3 (Somewhat Unsatisfied) 4 (Somewhat Satisfied) 5 (Satisfied) 6 (Very Satisfied).

PD providers most commonly reported challenges that prevented them from meeting with their caregiver(s), including finding time and having additional work responsibilities (50.7 and 26.0 percent, respectively; Appendix Table B.V.9).

E. Research question 2: Can WGT be used by early childhood professionals to support change in beliefs, knowledge, or practice concerning infants or toddlers?⁴³

Before and after implementation of WGT, participating caregivers and PD providers responded to measures about their beliefs, knowledge, and practice concerning infant and toddler care. In addition, caregivers' classrooms were observed using the Q-CCIIT before and after WGT implementation. In this section, we compare WGT data from fall 2018 to spring 2019 to understand whether caregivers and PD providers changed after implementation of WGT. We conducted tests of significance for analyses comparing subgroup estimates for center-based and FCC caregivers, as well as EHS and community-based caregivers. Note that our design does not allow for interpretation of findings as causal.

Consistent with reports of module use, caregivers' scores on items measuring beliefs about supporting language development increased from fall 2018 to spring 2019. Change was not detected for beliefs about support for social-emotional development, support for cognitive development, and knowledge of child development.

On the Q-CCIIT, for the full sample, only the observed quality of caregiver-child interactions in the Support for Social-Emotional development domain increased. Change on the Support for Language and Literacy Development domain score was not statistically detectable. Support for Cognitive Development showed a negative trend.

The multivariate analyses (controlling for the fall Q-CCIIT score and caregiver characteristics such as education, experience, and mental health, and classroom and program characteristics) indicated that **the dosage of WGT was related to the overall spring Q-CCIIT classroom quality score and the Support for Language and Literacy Development and Support for Cognitive Development domain scores**. However, the dosage indicators were not associated with the Support for Social-Emotional Development domain spring score after controlling for caregiver, classroom, and program characteristics.

In similar multivariate models controlling for caregiver characteristics, fall scores on the measure, and classroom and program characteristics, **WGT indicators were related to the caregiver's sense of self-efficacy**.

PD providers' scores on items measuring knowledge and beliefs about language development also increased from fall 2018 to spring 2019. Their use of various PD strategies changed between fall and spring, and their beliefs about professional development remained positive.

WGT caregivers improved in their beliefs about how to support language development from fall 2018 to spring 2019. Caregivers responded to several different measures related to their beliefs about the following: (1) supporting social-emotional development, (2) supporting language development, (3) supporting cognitive development, (4) overall beliefs about child development, and (5) knowledge about child development. **From fall 2018 to spring 2019, caregivers scored higher on items measuring their beliefs about supporting language development** (mean score increasing from 4.4 to 4.8 on a 6-point

⁴³ We developed the field test using a pre-post design. Findings should not be interpreted as causal because we did not include a comparison group.

scale;⁴⁴ Appendix Table B.III.2a). We observed an increase in this measure for the full sample, as well as in all caregiver subgroup analyses (center-based, FCC, EHS, and community-based caregivers; Appendix Tables C.14 and C.28).

This finding is consistent with information about the modules in which caregivers and PD providers chose to spend time—53.7 percent of caregivers reported that they spent most of their time working in one of the three language modules. **No significant changes were observed from fall to spring for beliefs about how to support social-emotional or cognitive development, for overall beliefs about child development or for the knowledge scales.**

1. Change in caregivers' self-efficacy as teachers

Caregivers reported higher self-efficacy as a teacher in spring 2019. Caregivers perceived a change in their ability to be effective in providing care (Exhibit IV.13). They reported a significant increase in self-efficacy from fall 2018 to spring 2019 (mean score of 4.6 to 4.8 on a 6-point scale; Appendix Table B.III.4).

Having a PD provider who participated in WGT PD provider training was associated with caregivers reporting stronger self-efficacy. After controlling for caregiver, classroom, and program characteristics, the number of training webinars attended by the PD provider and the caregiver's report of how much the PD provider contributed to self-efficacy were positively associated with the caregiver's spring self-efficacy. The number of implementation webinars attended by the PD provider was negatively associated with caregivers' self-efficacy in the spring. Because the implementation webinars were an optional activity intended to support PD providers and add training in areas for which they indicated a need for more information, we suspect that those attending the implementation webinars had less experience and prior training. Significant covariates included the fall self-efficacy score, the fall beliefs about development, and class size (all positive coefficients), and the Kessler-6 measure of psychological distress in the fall (negative coefficient).

Only the covariates of the fall score, class size, and being in an EHS setting were associated with the spring beliefs about development. All of these coefficients were positive. None of the WGT PD provider indicators in the model was significantly associated with spring beliefs about development.

Appendix F provides information about sensitivity analyses conducted with multiply imputed data sets using hierarchical linear modeling. These analyses supported the findings reported here.

⁴⁴ Caregiver ratings were on a scale of 1 (Strongly disagree), 2 (Disagree), 3 (Slightly disagree), 4 (Slightly agree), 5 (Agree), and 6 (Strongly agree).

Exhibit IV.13. Summary of significant model predictors of spring teacher-reported outcomes: FIML results

	Beliefs about development and practice (Baby FACES)	Teacher self-efficacy
PDP training attended		0.12*
PD implementation webinars		-0.15*
PD provider contributed to professional effectiveness (z-score)		0.14**
Covariates		
Fall teacher self-efficacy score ^a (z-score)		0.38***
Baby FACES beliefs scale—Fall (z-score)	0.64***	0.16*
Experience in ECE (z-score)		
Kessler-6 (z-score)		-0.11*
Class/group size	0.16*	0.02*
Caregiver:child ratio (z-score)		
Toddler classroom		
FCC		
EHS center	0.10*	0.15*

* $p \leq 0.05$; ** $p \leq 0.01$; *** $p \leq 0.001$.

^aNot included in the model predicting Baby FACES beliefs scale.

2. Change in PD providers' beliefs about how to support children's development and changes in PD strategy use

From fall 2018 to spring 2019, WGT PD providers demonstrated growth in their knowledge and beliefs about how to support children's language development. Similar to caregivers, PD providers also responded to measures about their beliefs across social-emotional development, language and literacy development, and cognitive development, as well as their overall beliefs about supporting development and knowledge about child development. From fall 2018 to spring 2019, PD providers' scores on a measure of beliefs about how to support children's language development increased significantly (mean score of 4.7 to 5.0 on a 6-point scale).⁴⁵ PD providers' scores on a measure of overall beliefs about child development decreased slightly (mean score of 5.1 to 5.0). No significant changes were observed from fall to spring for PD provider measures of beliefs about supporting social-emotional or cognitive development, or knowledge of child development (Appendix Table B.III.3a).

PD providers' beliefs about appropriate professional development remained positive. From fall 2018 to spring 2019, PD providers' beliefs about PD did not change significantly. The percentage of PD providers who reported that individual caregivers needed different PD approaches and that these approaches should be changed if the caregiver is not improving remained high between fall 2018 and spring 2019 (96 percent or more of caregivers agreed with these statements in both fall and spring; Appendix Table B.III.6).

⁴⁵ PD provider ratings were on a scale of 1 (Strongly disagree), 2 (Disagree), 3 (Slightly disagree), 4 (Slightly agree), 5 (Agree), and 6 (Strongly agree). Items discussing practices that do not support development were reverse-coded for scoring. Higher scores indicate stronger agreement with evidence-based practices for supporting development.

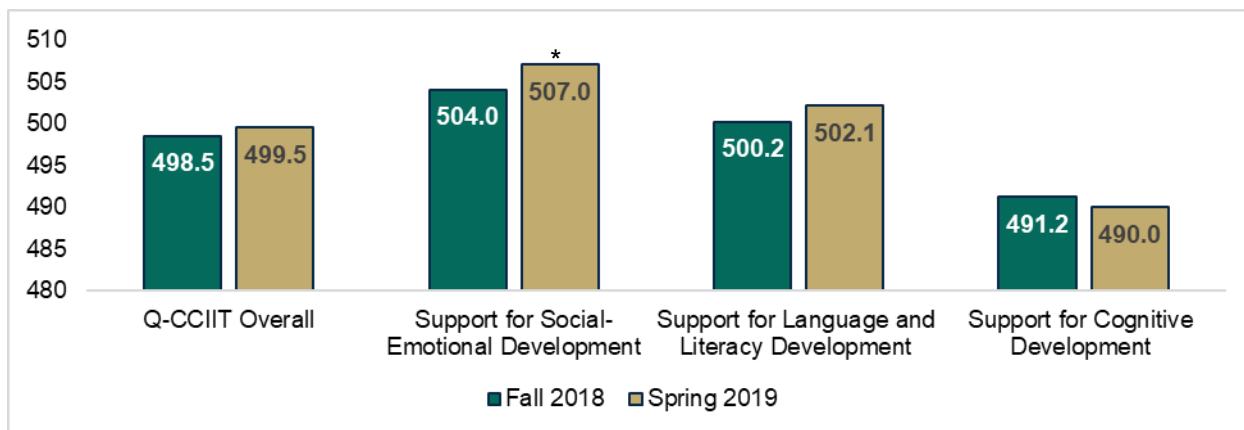
WGT PD providers’ reported use of various PD strategies changed between fall 2018 and spring 2019. PD providers’ reported use of having caregivers watch video recordings of their own teaching increased on average from about once a year to at least a few times a year (mean rating from 2.2 to 3.6 on a 6-point frequency scale).⁴⁶ In contrast, reported frequency of use of the following methods decreased from fall to spring: discussing in-person classroom observations (mean 4.6 to 4.2), suggesting trainings for caregivers to attend (mean 3.9 to 3.5), and providing trainings to caregivers (mean 3.6 to 3.1). No change was noted in how often PD providers had caregivers observe experienced teachers (Appendix Table B.III.7).

3. Observed quality of caregiver-child interactions: WGT Q-CCIIT scores and change

From fall 2018 to spring 2019, average scores for caregivers participating in WGT improved in the Support for Social-Emotional Development domain (Exhibit IV.14). This finding aligned with original hypotheses, since support for social-emotional development was woven into all module practices to varying extents.

Looking at change in Q-CCIIT scores by specific caregiver subgroup (Appendix Tables C.15b and C.29b), **EHS caregivers demonstrated a significant increase in Q-CCIIT ratings in the Support for Social-Emotional Development** (W-score increase from 503.8 to 509.7). Additionally, **for EHS caregivers, significant improvements were made in the Support for Language and Literacy Development domain** (W-score increase of 498.7 to 502.8). As noted above, more than half of all caregivers (53.7 percent) reported spending most of their time working in one of the three modules focusing on language and literacy practices. Among EHS caregivers, 57.7 percent spent most of their time working in this area (Appendix Table C.23).

Exhibit IV.14. WGT caregivers scored significantly higher in the Social-Emotional Development domain from fall 2018 to spring 2019 (W-score comparison)



Source: WGT Field Test 2019 Q-CCIIT observations.

Note: Mean score for W-scores is 500.

* Indicates a significant difference between fall and spring means (*p < 0.05).

⁴⁶ PD provider ratings were on a scale of 1 (Never), 2 (Once a year), 3 (A few times a year), 4 (One to three times a month), 5 (Once a week), and 6 (More than once a week).

4. Dosage for WGT associated with spring caregiver-child interaction quality

Our planned dosage indicator was to use monthly brief pop-up survey reports from caregivers and PD providers about their WGT activities that month. Unfortunately, we had very high levels of missingness. We examined alternative indicators and ultimately decided to use an indicator of the web pages that a caregiver or PD provider opened. Because there was a very large range with some variance that we thought was not meaningful, for caregivers we used an indicator of pages opened, by quartile. For the PD provider, we used a binary variable indicating that the PD provider was above the lowest quartile. PD providers had different numbers of caregivers and some PD providers opened and printed materials for their caregivers. For further discussion of the selection of the dosage indicator, see Appendix E.3. The models examining observed quality also included indicators for the caregiver report of how much the PD provider contributed to their effectiveness.

For the overall spring quality of caregiver-child interaction, significant predictors were the WGT dosage indicator ($ES = 0.12^*$),⁴⁷ the fall baseline Q-CCIIT score (and a negative coefficient for the number of weeks between observations and the start of WGT), and caregiver years in early childhood education.

The WGT dosage indicator was also positively associated with the spring Support for Language and Literacy ($ES = 0.16^{**}$) and Support for Cognitive Development ($ES = 0.12^*$) domains. The caregiver's rating of how much the support and resources provided by the WGT PD provider increased the caregiver's efficacy was also related to the Support for Cognitive Development domain score. Significant covariates for both domain scores included experience in ECE (positive coefficient) and the Kessler-6 report of psychological distress (negative coefficient). Support for Cognitive Development had additional significant covariates: caregiver:child ratio and being a caregiver in a toddler classroom were positive, and class size was negative, indicating an effect size decrease of more than one-tenth of a standard deviation for each additional child in the classroom.

Unlike the other domains and total score, none of the WGT estimates was significant for the Support for Social-Emotional Development domain score. Positive associations were found with the caregiver having a B.A. degree, caregiver:child ratio, working in an EHS center, and the fall score. Negative associations were found for group size and the number of weeks between the initial observation and starting WGT.

Other than the fall score for each measure, all effect sizes are small ($ES < 0.20$; Exhibit IV.15).

⁴⁷ * $p \leq 0.05$, ** $p \leq 0.01$, and *** $p \leq 0.001$ using one-tailed tests.

Exhibit IV.15. Summary of significant model predictors of quality of caregiver-child interaction: Multiple imputation results using FIML (spring 2019)

	Total Q-CCIIT	Support for Social-Emotional Development	Support for Cognitive Development	Support for Language and Literacy Development
Dosage (caregiver pages opened, quartile)	0.12*		0.11*	0.16**
PD supported teacher efficacy (z-score)			0.10*	
Covariates				
Fall score (z-score)	0.38***	0.37***	0.34***	0.34***
Number of weeks between observations	-0.11*	-0.14*		
B.A. degree		0.16*		
Experience in ECE (z-score)	0.13*		0.14**	0.13*
Kessler-6 (z-score)			-0.09*	-0.09*
Class/group size		-0.13*	-0.19**	
Caregiver:child ratio (z-score)		0.13*	0.11*	
Toddler classroom			0.12*	
EHS center		0.17*		

Source: WGT Field Test 2018 and 2019 Q-CCIIT observations, Fall 2018 WGT Caregiver Background Survey, and WGT Web user tracking data.

Note: FIML does not impute dependent variables, so the 26 cases without a spring Q-CCIIT observation were dropped from this analysis.

*p < 0.05; **p < 0.01; ***p < 0.001 (one-way test of significance).

Outcomes are z-scored so coefficients can be interpreted as effect sizes. Additional covariates were not significant in any of these models: other caregiver education indicators (some college, A.A., M.A.+), PD provider is supervisor, PD provider dosage (PD providers in the middle or high quartiles of WGT pages opened).

V. Summary and implications

A. Highlights and discussion of study findings

1. Who were the caregivers in the WGT field test?

The WGT study sample comprised 271 PD provider-caregiver pairs—271 caregivers and 168 PD providers from EHS and community-based centers and FCCs. The caregiver sample was racially/ethnically diverse. Forty-six percent of WGT caregivers identified as White, 39 percent as Black/African American, 25 percent as Hispanic/Latino, and 5 percent as Asian.⁴⁸ About 95 percent of caregivers worked full time. They had an average of about 11 years of experience in ECE.

About half of the sample of WGT caregivers had received an associate's degree or higher. However, education levels differed by caregiver subgroup, with EHS caregivers generally reporting higher education levels than their community-based counterparts. EHS caregivers also reported taking more courses in infant/toddler development and care, early childhood education, and child development and were more likely to have a CDA credential compared with community-based caregivers.

Most caregivers had prior experience participating in professional development activities before beginning WGT. Almost three-quarters of caregivers reported having a mentor, coach, or other PD provider *before* the study. Almost half of caregivers had a previous relationship with the WGT PD provider with whom they worked during this project and, on average, reported having a positive relationship with this PD provider. Less than half of all caregivers reported membership in a professional organization or network; of those, FCC caregivers were more likely to meet with such a support network than those in centers.

In fall 2018, caregivers reported satisfaction in working with infants and toddlers, and expressed being open to improving their practice as they embarked on WGT. Caregivers reported being very likely to continue working in infant/toddler care, particularly if they worked in FCCs. Most caregivers stated that they were open to improving their practice, with most identifying themselves as ready to change (higher in centers) or actively engaged in change (higher in FCCs). Overall, WGT caregivers reported low levels of depression and anxiety-related symptoms.

2. Who were the PD providers in the WGT field test?

In fall 2018, most WGT PD providers reported being internal coaches in their setting, typically worked with 13–14 caregivers on an ongoing basis, and were supervisors of the caregivers they coached. Most PD providers were White and female. About three-quarters of PD providers had attained a bachelor's degree or higher; about one-quarter had earned a master's degree or higher. Early childhood education was their primary degree field, and more than half reported membership in a professional organization or network. Most were funded by their program or center, whereas slightly less than one-quarter worked for an organization funded to provide free PD to ECE programs. PD providers themselves reported receiving reflective supervision in the past year, and nearly three-quarters were members of a PD provider support network.

⁴⁸ Respondents could mark all that applied.

WGT participants are not representative of PD providers and caregivers nationally. They agreed to participate in an intensive online PD program for approximately 4 months, with an additional month for PD provider remote training. They were comfortable using written materials in English. Therefore, readers should not draw conclusions about the PD experiences of PD providers and caregivers nationally using these data.

3. In which WGT modules did caregivers and PD providers report spending most of their time?

WGT modules provided a comprehensive range of domains of child development that caregiver and PD providers could use to improve their practice. Based on their baseline Q-CCIIT observation, we recommended that most caregivers use the Language Use module in WGT. The other two most frequently recommended modules were the Understanding of Language and Literacy modules. PD providers most commonly reported using those three modules with their caregivers, as well as the Support for Children's Behavior and Emotions module.

Similarly, more than half of the WGT caregivers reported spending most of their time in the Language Use or Behavior and Emotions modules; few reported spending most of their time in the Understanding Language or Literacy modules. There were some differences by setting type, with caregivers in center-based settings more likely to spend the most time in Language Use than caregivers in FCCs. In contrast, FCC caregivers were more likely to report spending more time in Literacy than were center-based caregivers. Community-based caregivers were more likely to spend the most time in the Behavior and Emotions module than their EHS counterparts. Other contrasts in module use were not significant.

4. How did caregivers access and respond to WGT materials?

Most caregivers logged onto the WGT website using Wi-Fi through a tablet. Although caregivers experienced initial challenges accessing the technological components of WGT, they reported the website was easy to use once they logged on. Caregivers were evenly divided between accessing the WGT website mostly at home or mostly at work; about three-quarters did so through the iPad mini we provided for the study. Most caregivers used Wi-Fi, although the iPads were equipped with cellular service. Most help desk inquiries involved accessing iPads and the WGT website. Once logged on, caregivers reported that the website was easy to learn and use to find the information they needed. Caregivers also appreciated links to additional relevant materials beyond WGT; of those caregivers who accessed a website recommended in the additional resources section of a module, nearly all planned to use that website again.

Across settings, caregivers who tried a WGT activity reported it to be useful. The activities most commonly reported as useful were trying WGT practices in their classroom, engaging in self-reflection, and receiving feedback from their PD provider. Nearly all caregivers used the iPad to video-record their practice; of those who did so, most found it useful.

On average, caregivers who tried a WGT tool reported it to be useful. Of the recommended tools, more than 80 percent of caregivers used presentations with a voice-over, questions for self-reflection with and without self-video, and summary handouts. Of the additional types of tools, caregivers most commonly used the step-by-step guides, handouts for families, and caregiver self-assessment checklists, and reported them to be useful.

Center-based caregivers felt supported by leadership and peers in their setting during WGT implementation. On average, caregivers reported challenges in finding time to participate in WGT

activities, given their already busy schedules and job responsibilities. These challenges included finding time to use online materials or practice with children, and having a PD provider who was too busy to meet with them. In particular, a greater percentage of FCC caregivers reported working more than eight hours a day, leaving little time for PD activities. Similarly, compared with EHS caregivers, a greater percentage of community-based caregivers reported working more than eight hours a day.

Caregivers reported having positive and trusting relationships with their PD providers and collaborating to set goals. Despite challenges in finding time to meet, most met more than once a month, including both in-person and virtual meetings.

More than 91 percent of caregivers overall and across different settings reported they had a positive experience with WGT. Caregivers most commonly agreed that WGT provided useful resources and helped them become more effective in interacting with children. Nearly all caregivers, across settings and WGT practices, reported that using the WGT practices helped infants and toddlers—especially with the development of language and literacy

5. How did PD providers respond to WGT materials?

Most PD providers who tried WGT coaching activities reported being satisfied with them, most commonly with observing caregiver practice via video or in-person, providing feedback to caregivers, and action planning activities. PD providers tended to spend more time on the WGT website reviewing coaching materials and training modules than reviewing the content in caregivers' recommended modules. **Similar to caregivers, PD providers reported challenges that prevented them from meeting with their caregivers,** including additional work responsibilities.

6. Did WGT support change in caregivers' beliefs and knowledge?

WGT caregivers agreed more with evidence-based beliefs about practices supporting language development in spring 2019 than in fall 2018. These practices formed the basis of WGT resources. We found an increase in this self-reported measure for the full sample and in each setting subgroup. The finding is consistent with the module in which caregivers spent most of their time working—more than half of caregivers worked primarily on one of the three language modules. Change was not detected for beliefs about supporting social-emotional development, supporting cognitive development, or knowledge of child development.

Caregivers reported change in their ability to be effective in providing care for infants and toddlers, with an increase in their teacher self-efficacy related to their WGT experiences. After controlling for caregiver, classroom, and program characteristics, the number of training webinars attended by their PD providers and the caregivers' report of how much the PD provider contributed to their self-efficacy were positively associated with their spring self-efficacy score. However, PD provider attendance at more of the implementation webinars was negatively associated with the caregiver's report of self-efficacy. Although open to all PD providers, the implementation webinars were optional and designed to address the needs of providers who expressed concerns or had difficulty understanding how to implement key WGT activities at or after the end of training.

After controlling for caregiver and setting characteristics, none of the indicators of WGT PD provider involvement in WGT training was significantly associated with spring caregiver reports of beliefs about development. Caregivers' fall beliefs about development, class size, and being in an EHS setting had positive associations with spring beliefs about development. The positive association with the class size—

also positively associated with caregiver's report of self-efficacy—indicates that caregivers with larger class sizes in community-based settings made greater change in their beliefs than those with smaller class sizes.

7. Did WGT support change in PD providers' beliefs, knowledge, and practice?

From fall 2018 to spring 2019, WGT PD providers agreed more with evidence-based beliefs and knowledge about how to support children's language development. WGT resources were closely aligned with these beliefs and knowledge. PD providers' scores decreased slightly on a measure of overall beliefs about child development that did not include WGT practices.⁴⁹ No significant changes were observed for PD provider measures of beliefs about supporting social-emotional or cognitive development, or their knowledge of child development (such as when children develop specific skills).

PD providers' reported use of different PD strategies evolved between fall and spring, including increases in reported use of video recordings of caregiver practice (a recommended activity in WGT). In contrast, there was a decrease in reported use of methods such as discussing in-person classroom observations and suggesting or providing trainings for caregivers to attend (neither of which were specific components of WGT). From fall to spring, PD providers responded consistently, on average, that PD approaches should be changed if the caregiver's practice is not improving, and that individual caregivers need different PD approaches.

8. Did WGT support change in caregivers' observed practice?

From fall to spring, average scores for the full sample of caregivers participating in WGT improved in the Support for Social-Emotional Development domain of the Q-CCIIT. This finding aligned with the original hypotheses; support for social-emotional development is a hallmark of all module practices to varying degrees.

Looking at change in Q-CCIIT scores by subgroup, EHS caregivers demonstrated a significant increase in Q-CCIIT scores in both Support for Social-Emotional Development and Support for Language and Literacy Development domains. As noted above, more than half of all caregivers, including EHS caregivers, spent most of their time working in one of the three modules focusing on language and literacy practices. More than one-third of caregivers in center-based settings spent the most time in the Language Use module, compared with less time by FCC caregivers. However, FCC caregivers were more likely than center-based caregivers to report time in the Literacy module. The items addressing literacy on the Q-CCIIT are the easiest to implement, especially with books readily available. Improvement in literacy practices may affect children's development and thus increase a caregiver's sense of efficacy; however, implementing those practices may not carry over to support for children's language development. Transferring skills from literacy to other learning activities may take a longer time or require more PD provider support.

Although it was difficult to select a dosage indicator for participation in WGT, we found that our selected indicator of WGT pages opened (by quartile) was significantly related to spring total Q-CCIIT scores. The fall baseline Q-CCIIT score, the caregiver's years in ECE, and a negative coefficient for number of

⁴⁹ This measure addressed knowledge of how capable even very young infants are; how to support positive physical health, such as preventing dental problems; and what child behaviors are indicators of future problems or disabilities.

weeks between observations and the start of WGT were other significant predictors of total Q-CCIIT scores.

Looking at domain-level Q-CCIIT scores, the WGT dosage indicator was also positively related to the spring Support for Language and Literacy and Support for Cognitive Development domain scores, along with other covariates. However, unlike the other domains and the total score, none of the WGT dosage estimates was significant for the Support for Social-Emotional Development domain score, although the indicator for EHS caregivers was. Caregivers with a bachelor's degree, smaller group sizes, and better caregiver:child ratios had stronger scores in Support for Social-Emotional Development in the spring, controlling for the fall observation in this domain and for EHS. The bachelor's degree was a significant covariate only in Support for Social-Emotional Development. This finding suggests that higher education pre-service training may have a stronger emphasis on this area.

B. Lessons learned and implications for future research designs

The WGT field test was designed to examine whether caregivers, working in concert with their local PD providers, could use the WGT intervention to change beliefs and knowledge of evidence-based practices or improve the quality of their practices with infants and toddlers. The intervention was intentionally designed to take place within real world conditions, using local PD providers and sampling from a range of ECE settings serving infants and toddlers across multiple localities. We developed the field test using a pre-post design. Findings should not be interpreted as causal because we did not include a comparison group.

From the first steps of selection and recruitment, we realized there would be challenges. At the setting level, contacts often needed to discuss requirements for participation with other decision makers and weigh other PD requirements. For example, EHS settings often needed program-level approval before committing to the study. A number of caregiver-provider pairs expressed concern about having the time to participate in the intervention, given their other responsibilities; some were unable to commit. For caregivers, these demands included managing curriculum and assessment, providing daily care for children from birth through age 3, and engaging in existing PD activities.⁵⁰ For PD providers, their mentoring caseloads often ranged beyond 10 caregivers, and they commonly had supervisory as well as PD responsibilities for these staff.

In fact, time and flexibility were serious challenges. Caregiver-PD provider pairs had difficulty finding time to meet and often spent less time than we had hoped engaging with the materials on the website. Some experienced difficulties engaging with the technology. However, they persisted, seeking help with access and mastering their iPads to record and share their practice with their mentors. They conferred with their PD provider to select one or more modules on which to work, trying out exercises in the classroom and taking note of children's progress.

We did find differences between caregiver-PD provider pairs working in EHS settings compared to those in community-based settings, which suggests important implications for future research. EHS PD providers may have had greater attunement to practice-based coaching approaches because of the program's emphasis on coaching. EHS programs often have smaller class sizes and shorter days relative

⁵⁰ Anecdotal evidence suggests that WGT did not fulfill the PD requirements that caregivers needed to meet; therefore, it required work beyond the other PD activities they were required to attend.

to community-based providers. An association of EHS with improved quality was found in some of the models predicting the overall Q-CCIIT and Support for Social-Emotional domain scores.

1. What would we like to examine more closely going forward?

Given the findings of the field test, we want to consider what adjustments—in the intervention materials and approach, selection of study sample, measurement, and study design—will be most informative about the value and usefulness of WGT to the field. Some examples of future research questions and approaches could include the following:

- Intentionally varying duration and frequency within the intervention: What length of time is optimal at what level of intensity? What measures of dosage are feasible to collect and would provide more information about the dosage of coaching and caregiver investment in the learning process?
- Ensuring adequate time for implementation: How can we ensure that caregivers and PD providers have the time needed to fully engage with the intervention? What supports and incentives will be needed? What alignment with existing PD system requirements and supports might be helpful?
- Comparing different types of PD providers: Is it more effective to hire dedicated mentors specific to the intervention versus recruiting and training local PD providers? What are the implications for needed resources and sustainability?
- Comparing different ways of providing PD support: For example, can we gain similar outcomes using virtual versus in-person PD support? What supports would be needed for a caregiver to implement WGT without support from a coach or mentor?
- Determining which method of mentoring is more effective: A PD provider supporting a whole teaching team or setting, or providing one-on-one support to a single caregiver? How helpful is peer support in implementing practices within or across classrooms in a setting?
- Tailoring the intervention to better support cognitive domain changes: Do PD providers need more training to effectively convey these practices? Should we consider changes to the modules and practices within the cognitive domain to better support understanding and use?
- Focusing on subgroups of primary interest: Which contrasts are of greatest policy interest? FCCs versus centers? EHS versus community-based? Caregivers with more experience or other qualifications versus less? Is there interest in examining differences across infant classrooms, toddler classrooms, and FCCs? Can we explore contrasts related to language background of caregivers, PD providers, and children in settings?
- Enhancing outcome measurement: Are changes needed in the outcome measures of interest? Are there updates to the Q-CCIIT that would better capture growth in practice? Are there additional caregiver-reported measures to consider?

Ultimately, with only four months of exposure (and often less), caregivers on average progressed toward improved self-efficacy and beliefs about practices for supporting the language development of infants and toddlers in their care. They showed improvement in the observed quality of caregiver-child interactions in the Support for Social-Emotional Development domain. However, as mentioned above, our design does not allow for causal interpretation. Caregivers expressed positive feelings about the WGT concepts and activities, the support given by their PD providers, and their ability to reflect on and change their practice. The lessons from this field test will be critical both for enhancing the WGT system and suggesting questions to be explored in further research.

References

- Abell, Ellen, Dilbur Arsiwalla, Robin Putnam, and Ellaine Miller. "Mentoring and Facilitating Professional Engagement as Quality Enhancement Strategies: An Overview and Evaluation of the Family Child Care Partnerships Program." *Child & Youth Care Forum*, vol. 43, no. 5, 2014, pp. 569–592.
- Aikens, N., and L. Akers. "Background Review of Existing Literature on Coaching." Report submitted to First 5 Los Angeles. Washington, DC: Mathematica Policy Research, July 2011.
- Aikens, N., L. Akers, and S. Atkins-Burnett. "Professional Development Tools to Improve the Quality of Infant and Toddler Care: A Review of the Literature." OPRE Report #2016-96. Washington, DC: Office of Planning, Research and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services, 2016.
- Allison, P. "Handling Missing Data by Maximum Likelihood." Paper 312-2012. *SAS Global Forum*, April 2012, available at <https://support.sas.com/resources/papers/proceedings12/312-2012.pdf>. Accessed June 12, 2020.
- Artman-Meeker, Kathleen, Angel Fettig, Erin E. Barton, Ashley Penney, and Songtian Zeng. "Applying an Evidence-Based Framework to the Early Childhood Coaching Literature." *Topics in Early Childhood Special Education*, vol. 35, no. 3, 2015, pp. 183–196.
- Atkins-Burnett, Sally, Shannon Monahan, Louisa Tarullo, Yange Xue, Elizabeth Cavadel, Lizabeth Malone, and Lauren Akers. "Measuring the Quality of Caregiver-Child Interactions for Infants and Toddlers (Q-CCIIT)." OPRE Report #2015-13. Washington, DC: U.S. Department of Health and Human Services, Administration for Children and Families, Office of Planning, Research and Evaluation, 2015.
- Barton, E.E., K. Kinder, A.M. Casey, and K.M. Artman. "Finding Your Feedback Fit: Strategies for Designing and Delivering Performance Feedback Systems." *Young Exceptional Children*, vol. 14, no. 1, 2011, pp. 29–46.
- Biringen, Z., S. Altenhofen, J. Aberle, M. Baker, A. Brosal, S. Bennett, E. Coker, C. Lee, B. Meyer, A. Moorlag, and R. Swaim. "Emotional Availability, Attachment, and Intervention in Center-Based Child Care for Infants and Toddlers." *Development and Psychopathology*, vol. 24, no. 1, 2012, pp. 23–34.
- Brown, Alice, and Sue Inglis. "So What Happens After the Event? Exploring the Realisation of Professional Development Within Early Childhood Educators." *Australasian Journal of Early Childhood*, vol. 38, no. 1, 2013, pp. 11–15.
- Cannon, J., K. Schellenberger, A. Defnet, A. Bloomenthal, Y. Xue, and C.A. Vogel. "Baby FACES 2018: Data Users' Guide." Washington, DC: Office of Planning, Research and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services, 2019.
- Casey, A.M., and R.A. McWilliam. "The Impact of Checklist-Based Training on Teachers' Use of the Zone Defense Schedule." *Journal of Applied Behavior Analysis*, vol. 44, no. 2, 2011, pp. 397–401.
- Chen, Deborah, M. Diane Klein, and Lavada Minor. "Interdisciplinary Perspectives in Early Intervention: Professional Development in Multiple Disabilities through Distance Education." *Infants and Young Children*, vol. 22, no. 2, 2009, pp. 146–158.

References

- Denton, Paula, and Roxann Kriete. *The First Six Weeks of School*. Strategies for Teachers Series. Greenfield, MA: Northeast Foundation for Children, 2000.
- Domitrovich, C.E., S.D. Gest, S. Gill, K.L. Bierman, J.A. Welsh, and D. Jones. "Fostering High-Quality Teaching with an Enriched Curriculum and Professional Development Support: The Head Start REDI program." *American Educational Research Journal*, vol. 46, no. 2, 2009, pp. 567–597.
- Downer, J.T., J. LoCasale-Crouch, B. Hamre, and R. Pianta. "Teacher Characteristics Associated with Responsiveness and Exposure to Consultation and Online Professional Development Resources." *Early Education and Development*, vol. 20, no. 3, 2009, pp. 431–455.
- Drago-Severson, E., and J. Blum-DeStefano. *Tell Me So I Can Hear You: A Developmental Approach to Feedback for Educators*. Cambridge, MA: Harvard Education Press, 2017.
- Dunn, L.M., L.L. Dunn, and D.M. Dunn. *Peabody Picture Vocabulary Test, Fourth Edition Examiner's Manual and Norms Booklet*. Circle Pines, MN: American Guidance Service, 2006.
- Dunst, C.J., M.B. Bruder, and D.W. Hamby. "Metasynthesis of Inservice Professional Development Research: Features Associated with Positive Educator and Student Outcomes." *Educational Research and Reviews*, vol. 10, no. 12, 2015, pp. 1731–1744.
- Dunst, C.J., and C.M. Trivette. "Let's Be PALS: An Evidence-Based Approach to Professional Development." *Infants & Young Children*, vol. 22, no. 3, 2009, pp. 164–176.
- Fukkink, Ruben G., and Anna Lont. "Does Training Matter? A Meta-Analysis and Review of Caregiver Training Studies." *Early Childhood Research Quarterly*, vol. 22, no. 3, 2007, pp. 294–311.
- Geller, S., and K.B. Lynch. "Teacher Opinion Survey." [Measurement Instrument]. Virginia Commonwealth University Intellectual Property Foundation and Wingspan, LLC, 1999.
- Guss, Shannon S., Deborah J. Norris, Diane M. Horm, Lisa A. Monroe, and Vicki Wolfe. "Lessons Learned About Data Utilization from Classroom Observations." *Early Education & Development*, vol. 24, no. 1, 2013, pp. 4–18.
- Hollingsworth, Heidi, and Chih-Ing Lim. "Instruction via Web-Based Modules in Early Childhood Personnel Preparation: A Mixed-Methods Study of Effectiveness and Learner Perspectives." *Early Childhood Education Journal*, vol. 43, no. 2, 2015, pp. 77–88.
- IOM and NRC. "Transforming the Workforce for Children Birth Through Age 8: A Unifying Foundation." Washington, DC: The National Academies Press, 2015.
- Kessler, Ronald C., Peggy R. Barker, Lisa J. Colpe, Joan F. Epstein, Joseph C. Gfroerer, Eva Hiripi, Mary J. Howes, Sharon-Lise T. Normand, Ronald W. Manderscheid, Ellen E. Walters, and Alan M. Zaslavsky. "Screening for Serious Mental Illness in the General Population." *Archives of General Psychiatry*, vol. 60, no. 2, 2003, pp. 184–189. [Measurement Instrument].
- Krick Oborn, Kellie M., and LeAnne D. Johnson. "Coaching via Electronic Performance Feedback to Support Home Visitors' Use of Caregiver Coaching Strategies." *Topics in Early Childhood Special Education*, vol. 35, no. 3, 2015, pp. 157–169.
- Kyzar, Kathleen B., Caya Chiu, Peggy Kemp, Heather M. Aldersey, Ann P. Turnbull, and David P. Lindeman. "Feasibility of an Online Professional Development Program for Early Intervention Practitioners." *Infants & Young Children: An Interdisciplinary Journal of Early Childhood Intervention*, vol. 27, no. 2, 2014, pp. 174–191.

References

- Lynch, Eleanor W., and Marci J. Hanson (eds.). *Developing Cross-Cultural Competence: A Guide for Working with Young Children and their Families, Fourth Edition*. Baltimore, MD: Paul H. Brookes Publishing Co., 2011.
- Madill, R., T. Halle, T. Gebhart, and E. Shuey. "Supporting the Psychological Well-Being of the Early Care and Education Workforce: Findings from the National Survey of Early Care and Education." OPRE Report #2018-49. Washington, DC: Office of Planning, Research and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services, 2018.
- Mattera, Shira, Chrishana M. Lloyd, Mike Fishman, and Michael Bangser. "A First Look at the Head Start CARES Demonstration: Large-Scale Implementation of Programs to Improve Children's Social-Emotional Competence." OPRE Report #2013-47. Washington, DC: Office of Planning, Research and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services, 2013.
- Moreno, Amanda J., Sheridan Green, and Jo Koehn. "The Effectiveness of Coursework and Onsite Coaching at Improving the Quality of Care in Infant-Toddler Settings." *Early Education and Development*, vol. 26, no. 1, 2015, pp. 66–88.
- Morris, Pamela, Chrishana M. Lloyd, Megan Millenky, Nicole Leacock, C. Cybele Raver, Michael Bangser, and MDRC. "Using Classroom Management to Improve Preschoolers' Social and Emotional Skills: Final Impact and Implementation Findings from the Foundations of Learning Demonstration in Newark and Chicago." New York: MDRC, 2013.
- Muthén, L.K., and B.O. Muthén. *Mplus User's Guide (7th ed.)*. Los Angeles, CA: Muthén & Muthén, 1998–2012.
- National Survey of Early Care and Education (NSECE) Project Team. "Number and Characteristics of Early Care and Education (ECE) Teachers and Caregivers: Initial Findings from the National Survey of Early Care and Education (NSECE)." OPRE Report #2013-38, Washington DC: Office of Planning, Research and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services, 2013.
- NSECE Project Team (National Opinion Research Center). "National Survey of Early Care and Education (NSECE), 2010–2014." ICPSR35519-v1. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 2014, pp. 11–18.
- Neuman, Susan B., and Tanya S. Wright. "Promoting Language and Literacy Development for Early Childhood Educators: A Mixed-Methods Study of Coursework and Coaching." *Elementary School Journal*, vol. 111, no. 1, 2010, pp. 63–86.
- Ottley, Jennifer R., and Mary F. Hanline. "Bug-in-Ear Coaching: Impacts on Early Childhood Educators' Practices and Associations with Toddlers' Expressive Communication." *Journal of Early Intervention*, vol. 36, no. 2, 2014, pp. 90–110.
- Parker, Andrea. "Make Your Classroom Honeymoon Phase Last the Whole Year." American College of Education. 2019. Available at <https://www.ace.edu/blog/post/2019/09/16/make-your-classroom-honeymoon-phase-last-the-whole-year>. Accessed June 12, 2020.
- Paulsell, Diane, Debra Mekos, Patricia Del Grosso, Cassandra Rowand, and Patti Banghart. "Strategies for Supporting Quality in Kith and Kin Child Care: Findings from the Early Head Start Enhanced Home Visiting Pilot Evaluation. Final Report." Princeton, NJ: Mathematica Policy Research, 2006.

References

- Paulsell, Diane, Toni Porter, Gretchen Kirby, Kimberly Boller, Emily S. Martin, Andrew Burwick, and Christine Ross. "Supporting Quality in Home-Based Child Care: Initiative Design and Evaluation Options." Princeton, NJ: Mathematica Policy Research, 2010.
- Peterson, S.M., A.C. Baker, and M.R. Weber. *Stages of Change Scale for Early Education and Care 2.0: Professional Manual*. Rochester, NY: Children's Institute, 2010. [Measurement Instrument].
- Powell, D.R., K.E. Diamond, M.R. Burchinal, and M.J. Koehler. "Effects of an Early Literacy Professional Development Intervention on Head Start Teachers and Children." *Journal of Educational Psychology*, vol. 102, no. 2, 2010, p. 299.
- Schrank, F.A., N. Mather, and K.S. McGrew. *Woodcock-Johnson IV Tests of Achievement*. Rolling Meadows, IL: Riverside, 2014a.
- Schrank, F.A., K.S. McGrew, and N. Mather. *Woodcock-Johnson IV Tests of Cognitive Abilities*. Rolling Meadows, IL: Riverside, 2014b.
- Trivette, Carol M., Melinda Raab, and Carl J. Dunst. "An Evidence-Based Approach to Professional Development in Head Start Classrooms." *NHSA Dialog*, vol. 15, no. 1, 2012, pp. 41–58.
- U.S. Department of Education, Office of Planning, Evaluation, and Policy Development, Policy and Program Studies Service. "Toward the Identification of Features of Effective Professional Development for Early Childhood Educators, Literature Review." Washington, DC: U.S. Department of Education, 2010.
- Weber-Mayrer, Melissa M., Shayne B. Piasta, and Christina Yeager Pelatti. "State-Sponsored Professional Development for Early Childhood Educators: Who Participates and Associated Implications for Future Offerings." *Journal of Early Childhood Teacher Education*, vol. 36, no. 1, 2015, pp. 44–60.
- Weinstock, Phyllis, Johannes Bos, Fannie Tseng, Emily Rosenthal, Lorena Ortiz, Chantelle Dowsett, Aletha Huston, and Alison Bentley. "Evaluation of Program for Infant/Toddler Care (PITC): An On-Site Training of Caregivers." Final report. NCEE 2012-4003. National Center for Education Evaluation and Regional Assistance, 2012.
- Whitebook, M., D. Phillips, and C. Howes. "Worthy Work, STILL Unlivable Wages: The Early Childhood Workforce 25 Years After the National Child Care Staffing Study." Center for the Study of Child Care Employment Institute for Research on Labor and Employment, University of California, Berkeley, 2014.
- Woodcock, Richard. "What Rasch Based Scores Convey." In *New Rules of Measurement: What Every Psychologist and Educator Should Know*, edited by Susan E. Embretson, and Scott L. Hershberger (pp. 105–127). Mahwah, NJ: Lawrence Erlbaum, 1999.

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