Research Brief

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Measuring Head Start Children's Early Learning Skills Using Teacher Reports During the COVID-19 Pandemic

Key findings

- We examined two teacher-reported scales of children's skills in the Head Start Family and Child Experiences Survey (FACES) 2014 and 2019. We examined whether these scales have strong measurement properties and validly measure early learning skills in a nonbiased way. We did this to understand whether teacher-reported scales can be used when in-person assessment is not feasible, such as in spring 2020 during the COVID-19 pandemic.

- A teacher-reported scale of children's **approaches to learning** has strong measurement properties. However, this scale is only weakly associated with assessor-reported cognitive/ social behavior and directly assessed executive function. Therefore, teacher-reported approaches to learning scores are not an appropriate proxy for these skills.

- A teacher-reported scale of children's **literacy skills** has strong measurement properties. This scale is moderately to strongly associated with directly assessed language and cognitive skills, which suggests it might be able to be used as a proxy for these skills. This scale might offer a way to measure children's language and cognitive skills when in-person assessment is not feasible.

- However, there is potential bias in these teacher-reported scales because teacher reports (but not similar skills measured in the direct child assessment) are associated with some child background characteristics in FACES 2014. In the spring, after accounting for fall scores, English primary home language is associated with lower teacher-reported **approaches to learning** scores; this association is not found with assessor-reported cognitive/social behavior (attention). Also, being male is associated with lower teacher-reported **literacy skills** scores in spring, after accounting for fall skills, but this association is not found with a directly assessed language and cognitive skill (letter-word knowledge). Primary home language and child sex should be accounted for when using these teacher reports.

In spring 2020, in response to the COVID-19 (for coronavirus disease 2019) pandemic, many early care and education centers, including Head Start centers, closed their physical buildings and changed their operations to virtual (Doran et al. 2022b).[1] Because of health and safety restrictions, we were unable to directly assess children's skills in spring 2020 for the Head Start Family and Child Experiences Survey (FACES 2019). However, teachers did complete reports about individual children in their classrooms, as has been done in prior rounds of FACES. We explore whether teacher reports of children's approaches to learning and literacy skills offer a reliable, valid, and nonbiased way to measure aspects of children's early learning skills as a proxy for the skills measured in the direct child assessment (Box 1).

Teacher-reported scales have been recommended as a valid way to capture children's skills, given that teachers observe and interact with children regularly (Snow and Van Hemel 2008). Weak to strong associations have been reported between various teacher-reported scales and direct assessments of children. These findings suggest that some teacher-reported scales could be used as proxies for capturing children's early learning skills when direct assessments are not available (Miller-Bains et al. 2017; Moiduddin et al. 2010; Russo et al. 2019; Vitiello and Williford 2021; Wakabayashi et al. 2019).

To measure one aspect of children's early learning skills, FACES uses teacher reports of children's approaches to learning (Box 2). The scale has been found to be reliable in other studies with similar populations (Fantuzzo et al. 2004; Hahn et al. 2009; McDermott et al. 2002; Rock and Pollack 2002; Yen et al. 2004). Past research has found that children rated higher on approaches to learning also make greater gains on later cognitive direct assessments (Bodovski and Farkas 2007; Duncan et al. 2007; Li-Grining et al. 2010). Some studies have found differences in teacher-reported approaches to learning by children's characteristics. Being male

Box 1. Key definitions

Strong measurement properties refer to whether:

- Scales are **reliable**; they provide similar results over different conditions. One indicator of reliability is that the items measure the same skill or ability (also known as internal consistency reliability).
- Scales do not have **floor or ceiling effects**; there are enough easy and hard items to measure the full range of ability.
- Scales show limited **rater effects**; the extent to which teachers differ in how they use the scales is limited. This ensures that differences in scores reflect differences between children across teachers, not just differences in how teachers use the scales.

Validity refers to whether the scales accurately represent the skill that they are supposed to be measuring and are appropriate for the purpose for which they are being used. In this case, we aim to use teacher-reported scales as a proxy for early learning skills usually measured in the FACES direct child assessment (Box 2). Therefore, we look for evidence of convergent validity, or positive correlations of the teacher-reported scales with assessor-reported cognitive/social behavior and directly assessed executive function and language and cognitive skills at the same time point.

Rater bias refers to teachers *systematically* rating some children higher or lower based on the child's characteristics.

and living in a household with low income were associated with smaller gains in these skills (Buek 2019). Latino children made larger gains in these skills compared with children who are White, Black, or other races or ethnicities (McDermott et al. 2018). It is important to examine whether these differences reflect actual differences or bias in teacher-reported approaches to learning.

Box 2. Teacher reports of children's early learning skills in FACES 2014 and 2019

We examine two teacher-reported scales in this brief (see Table A.1 for items):

- The Early Childhood Longitudinal Study, Kindergarten (ECLS–K) **approaches to learning** scale measures children's motivation, attention, organization, persistence, and independence in learning (six items; U.S. Department of Education 2002).

  - *We explore whether this scale could serve as a proxy for children's directly assessed executive function (a pencil-tapping task in 2014 and the Minnesota Executive Function Scale App [MEFS App™] in 2019) and assessor-reported cognitive/social behavior (Leiter International Performance Scale), particularly their attention.*

- The **literacy skills** scale measures children's early writing and reading skills (eight items adapted from the National Household Education Survey; U.S. Department of Education 2000).

  - *We explore whether this scale could serve as a proxy for children's directly assessed language and cognitive skills (Peabody Picture Vocabulary Test; Expressive One-Word Picture Vocabulary Test; Woodcock-Johnson Tests of Achievement Applied Problems, Letter-Word Identification, and Spelling), particularly their letter-word knowledge.*

FACES uses teacher reports of children's literacy skills (Box 2). Similar scales have been shown to be associated with direct assessments of these same skills (Cabell et al. 2009; Claessens et al. 2009; Duncan et al. 2007; Farrington and Lonigan 2010; Hair et al. 2006; Lonigan et al. 2011). Recent evaluations of preschool programs have begun using teacher-reported literacy skills as outcomes, citing evidence of their reliability and validity (Atteberry et al. 2019; Reynolds et al. 2016). Despite the common use of teacher reports of literacy skills in research studies, few studies have examined whether there is bias in how teachers rate certain groups of children. Examining the measurement properties, validity, and bias of such scales can further support their use as less resource-intensive ways to measure children's skills.

We addressed three research questions to determine whether teacher reports of children's approaches to learning and literacy skills can be used to measure aspects of children's early learning skills when direct assessments are not available. First, we examined the measurement properties of the teacher-reported scales. We did this to determine whether the scales reliably measure the skills of children with varied abilities, and do not just reflect differences in how teachers use the scales (Box 1). We also examined whether there are different patterns in how teachers used the scales in spring 2020 when teachers were reporting during the COVID-19 pandemic when most Head Start centers were physically closed. Second, we examined the associations between the teacher-reported scales and assessor-reported cognitive/social behavior and directly assessed executive function and language and cognitive skills. This enabled us to determine whether the teacher-reported scales can be used as proxies for these skills. Third, we examined rater bias. Past research suggests that some teacher reports are associated with children's background characteristics, as summarized earlier. If there is rater bias, it will be important to account for child background characteristics in analyses using the teacher-reported scales.

Methods

To examine teacher reports of children's approaches to learning and literacy skills, we used data collected in fall 2019 and spring 2020 from FACES 2019, as well as data collected in fall 2014 and spring 2015 from FACES 2014 (see box at the end for more details about the sample).[2] When teachers reported about children between April and July 2020 (spring 2020), most Head Start programs had physically closed, but more than half of programs were using classroom communication tools or videoconferencing platforms (Doran et al. 2022b). Below, we describe the analyses we conducted to address each research question.

What are the measurement properties of teacher reports of children's approaches to learning and literacy skills?

We examined the measurement properties of teacher-reported approaches to learning and literacy skills in fall and spring of FACES 2014 and 2019. We first measured the teacher-reported scales' reliability using Cronbach's alpha. To assess whether the scales have floor or ceiling effects in fall or spring, we graphically examined the percentage of children with each score. We then examined rater effects by examining the degree to which children within the same classroom had similar scores on the skills measured by the direct child assessment and teacher reports (by calculating intraclass correlations for classrooms, centers, and programs). If the scores for children in a classroom are much more similar for the teacher-reported scales than for the skills measured in the direct child assessment, this would suggest that children's scores reflect differences in how teachers are using the scales, rather than differences in children's skills. Finally, we calculated means, standard deviations, and ranges for approaches to learning and literacy skills to determine how scores vary at each time point. This enabled us to determine if there are any differences in how teachers are using the scales in the context of the COVID-19 pandemic in spring 2020.[3,4]

How are teacher reports of children's approaches to learning and literacy skills associated with assessor reports and direct assessments of children's skills?

For fall and spring in FACES 2014 and fall in FACES 2019, we examined convergent validity, or the associations between the teacher-reported scales and assessor-reported cognitive/social behavior and directly assessed executive function and language and cognitive skills at the same time point. We did this to evaluate whether the teacher-reported scales can be used as proxies for skills usually measured by the direct child assessment.[5]

Is there bias in how teachers rate certain groups of children on approaches to learning or literacy skills?

We examined associations between children's background characteristics and (1) the teacher-reported scales and (2) the assessor report and direct assessment to which the teacher-reported scales were conceptually most similar (assessor-reported attention for approaches to learning and directly assessed letter-word knowledge for literacy skills) in spring 2015, accounting for fall 2014 scores on the assessment.[6] We compared associations for primary home language (the language that is usually or always spoken to child in the home), sex, age in months at the time of the fall teacher reports, and race or ethnicity. If there are significant associations between children's background characteristics and the teacher-reported scales, but not for the most similar skills from the direct child assessment, this might suggest bias in how teachers are rating children. We also compared the associations of the background characteristics and the teacher-reported scales for the spring 2015 data to the spring 2020 data to examine whether the patterns are similar, as it is possible that teachers rate children differently with less in-person exposure to children.

See the accompanying technical report for more details about the sample, assessments, methods, and results of supplementary analyses (Nguyen et al. 2022).

What are the measurement properties of teacher reports of children's approaches to learning and literacy skills?

We examined the measurement properties of teacher reports of children's approaches to learning and literacy skills in the fall and spring of FACES 2014 and 2019. First, we examined whether scales have strong reliability. Second, we looked at whether scales have floor or ceiling effects. Third, we examined whether teacher-reported scales represent actual differences between children and not just differences in how teachers use the scales to rate children. Fourth, we examined whether scores are similar between FACES 2014 and 2019 to determine whether teachers rated children differently in spring 2020 during the COVID-19 pandemic.

The approaches to learning and literacy skills scales each measure one underlying skill. Reliability for both scales is above the target of 0.80 at all time points (Table 1), suggesting that items measure one type of skill. Reliability is similar at all time points for each scale.

The approaches to learning and literacy skills scales have variation across the range of potential scores. Although scores are not normally distributed for both scales, there is little evidence of floor or ceiling effects; less than 25 percent of children have scores at the top or bottom of the distributions at any time point (see Figures 1 and 2 for distributions in spring 2020; see the technical report for figures for other time points; Nguyen et al. 2022).

Table 1. Scale reliabilities (Cronbach's alphas)

Time point	Approaches to learning	Literacy skills
Fall 2014	0.92	0.82
Spring 2015	0.93	0.81
Fall 2019	0.92	0.82
Spring 2020	0.93	0.83

Source: Fall 2014, Spring 2015, Fall 2019, and Spring 2020 FACES Teacher Child Report.
Note: Approaches to learning has six items; literacy skills has eight items.
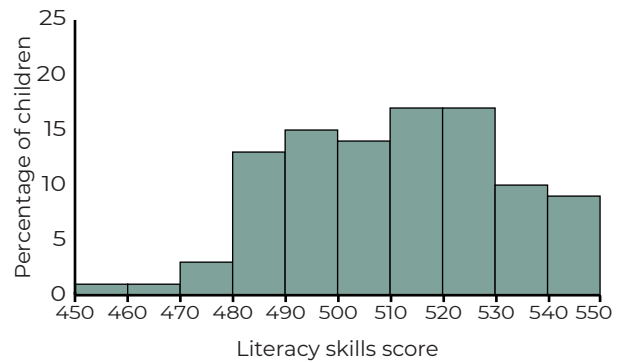
Figure 1. Distribution of approaches to learning scores, spring 2020

Figure 2. Distribution of literacy skills scores, spring 2020
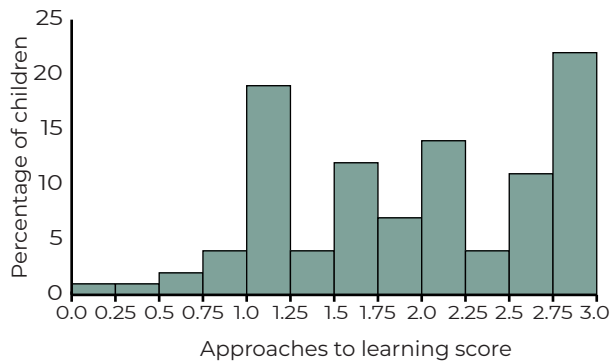
Source: Spring 2020 FACES Teacher Child Report.
Note: Statistics are weighted to represent all children who were enrolled in Head Start in the fall and were still enrolled in spring. For the approaches to learning scale, teachers rated each child on a scale of 0 (never) to 3 (very often) on the six items, and item scores were averaged, with higher scores indicating stronger skills. To create the literacy skills scale, we used Rasch analyses and then transformed the results to W scores that have a mean item difficulty of 500 and a range of 300 to 700, with higher scores indicating stronger skills.

Teacher reports of children's approaches to learning and literacy skills seem to capture differences between children, not just differences in how teachers use the scales. For teacher-reported approaches to learning, 18 to 25 percent of the variance in children's scores is explained by the classroom (Table 2). This is more than the variance explained by the classroom for assessor-reported cognitive/social behavior and directly assessed executive function (0 to 10 percent). Teachers' reports of approaches to learning for children in the same classroom are more similar than children's assessor reports or direct assessments; this indicates that some portion of children's approaches to learning scores is due to rater effects. However, about 75 percent of the variance can still be explained by differences between children. For teacher-reported literacy skills, 11 to 18 percent of the variance in children's scores is explained by the classroom. This is comparable to the 7 to 19 percent of variance explained by the classroom for directly assessed language and cognitive skills. This suggests that teachers are rating literacy skills for children in the same classrooms more similarly because children in those classrooms have more similar literacy skills, and not because of rater effects.

In fall 2014 and 2019 and spring 2015 and 2020, children's approaches to learning and literacy skills scores are similar. In fall 2019, teacher reports of children's approaches to learning and literacy skills are similar to those in fall 2014. In spring 2020, teacher reports are also similar to spring 2015, indicating children make similar gains across program years (Table 3). This pattern supports that it is appropriate to examine associations between teacher-reported scales and skills from the direct child assessment in FACES 2014 to understand whether teacher-reported scales can be used as proxies for these skills. Teachers do not seem to be rating children differently in spring 2020 during the COVID-19 pandemic when many Head Start centers were physically closed.

How are teacher reports of children's approaches to learning and literacy skills associated with assessor reports and direct assessments of children's skills?

Overall, the teacher-reported approaches to learning and literacy skills scales have been shown to have strong measurement properties. Given that, we explored whether they are valid assessments of skills usually measured by the direct child assessment. We examined whether these teacher-reported scales are associated with children's assessor-reported cognitive/social behavior and directly assessed executive function and language and cognitive skills in fall and spring of FACES 2014 and fall of FACES 2019.

Table 2. Variance explained by the classroom for assessments of children's skills

Time point	Teacher-reported approaches to learning	Assessor-reported cognitive/social behavior and directly assessed executive function skills[a]	Teacher-reported literacy skills	Directly assessed language and cognitive skills[b]
Fall 2014	0.25	0.00 to 0.10	0.18	0.08 to 0.19
Spring 2015	0.18	0.05 to 0.09	0.13	0.07 to 0.16
Fall 2019	0.24	0.00 to 0.07	0.16	0.07 to 0.14
Spring 2020	0.24	NA	0.11	NA

Source: Fall 2014, Spring 2015, Fall 2019, and Spring 2020 FACES Teacher Child Report and Fall 2014, Spring 2015, and Fall 2019 FACES Direct Child Assessment.

[a] This included the Leiter International Performance Scale cognitive/social behavior subscales (Revised Edition in 2014–2015 and Third Edition in 2019), a pencil-tapping task in 2014 and 2015, and the Minnesota Executive Function Scale App (MEFS App™) in 2019.

[b] This included the Woodcock-Johnson (WJ) Tests of Achievement Spelling, Letter-Word Identification, and Applied Problems subscales (WJ III in 2014 and 2015 and WJ IV in 2019); the Peabody Picture Vocabulary Test (PPVT) (PPVT–4 in 2014 and 2015 and PPVT–5 in 2019); and the Expressive One-Word Picture Vocabulary Test (EOWPVT–4).

NA = not available.

Table 3. Means and standard deviations for teacher-reported approaches to learning and literacy skills

Teacher-reported scale (time point)	FACES 2014			FACES 2019			
	Mean	SD	Range	Mean	SD	Range	*p*-value
Approaches to learning[a] (fall)	1.73	0.72	0 to 3	1.69	0.81	0 to 3	0.72
Approaches to learning[a] (spring)	1.92	0.74	0 to 3	1.93	0.77	0 to 3	0.93
Literacy skills[b] (fall)	495.60	21.19	451 to 547	493.74	21.54	452 to 546	0.49
Literacy skills[b] (spring)	513.76	20.88	451 to 548	509.94	21.41	451 to 547	0.08

Source: Fall 2014, Spring 2015, Fall 2019, and Spring 2020 FACES Teacher Child Report.

Note: Statistics are weighted to represent all children who were enrolled in Head Start in fall and were still enrolled in spring. *p*-values are based on independent sample *t*-tests comparing scores from each time point in FACES 2014 to the same time point in FACES 2019.

[a] Teachers rated each child on a scale of 0 (never) to 3 (very often) on the six items, and item scores were averaged, with higher scores indicating stronger approaches to learning.

[b] To create the literacy skills scale, we used Rasch analyses and then transformed the results to W scores that have a mean item difficulty of 500 and a range of 300 to 700, with higher scores indicating stronger skills.

SD = standard deviation.

Teacher-reported approaches to learning is weakly associated with children's assessor-reported cognitive/social behavior and directly assessed executive function. Approaches to learning might not be an appropriate proxy for these skills because it measures different skills. Contrary to expectations (Box 2), teacher-reported approaches to learning has weak correlations (0.21 to 0.38; Table 4) with assessor-reported cognitive/social behavior and directly assessed executive function. In fact, these correlations are similar to those between teacher-reported approaches to learning and directly assessed language and cognitive skills, where we expected weaker associations (0.25 to 0.43). The weak correlations with children's cognitive/social behavior and executive function could reflect that these skills are measured in a relatively brief one-on-one interaction with a novel adult, whereas teacher reports of approaches to learning are based on children's behavior over time in the classroom. The approaches to learning scale also measures multiple skills, including motivation, organization, persistence, and independence in learning. Although the approaches to learning scale

provides important information about children's later learning (Duncan et al. 2007), it is not a useful proxy for assessor-reported cognitive/social behavior or directly assessed executive function among Head Start children.

Teacher-reported literacy skills are mostly moderately to strongly associated with directly assessed language and cognitive skills. This teacher-reported scale might be a useful proxy for directly assessed language and cognitive skills. The teacher-reported literacy skills scale has mostly moderate to strong correlations (0.39 to 0.65; Table 5) with directly assessed language and cognitive skills. As expected (Box 2), the strongest correlation is with letter-word knowledge. Also consistent with expectations, these correlations are generally stronger than the ones with assessor-reported cognitive/social behavior and directly assessed executive function (0.11 to 0.40). Therefore, these findings provide some evidence that teacher reports of children's literacy skills are a valid proxy for directly assessed language and cognitive skills among Head Start children.

Table 4. Correlations between teacher-reported approaches to learning and other assessments, within each time point

Teacher-reported scales		Assessor-reported cognitive/social behavior and directly assessed executive function						Directly assessed language and cognitive skills				
Scale and time point	Literacy skills	Sociability[a]	Activity[a]	Attention[a]	Organization[a]	Executive function[b]	Receptive vocabulary[c]	Expressive vocabulary[d]	Early writing[e]	Letter-word knowledge[e]	Early math[e]
Approaches to learning (fall 2014)	**0.50**	0.33	0.33	0.38	0.37	0.32	0.33	0.35	0.39	0.27	**0.42**
Approaches to learning (spring 2015)	**0.50**	0.21	0.29	0.28	0.28	0.32	0.25	0.30	0.34	0.27	0.36
Approaches to learning (fall 2019)	**0.63**	0.22	0.29	0.37	0.36	0.19	0.27	0.34	**0.43**	0.38	**0.43**
Approaches to learning (spring 2020)	**0.59**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Source: Fall 2014, Spring 2015, Fall 2019, and Spring 2020 FACES Teacher Child Report and Fall 2014, Spring 2015, and Fall 2019 FACES Direct Child Assessment.

Note: Statistics are weighted to represent all children who were enrolled in Head Start in the fall and were still enrolled in the spring. All correlations in this table are statistically significant at $p \leq 0.05$.

Shading key

Light gray—correlations that are weak (<0.40)

Dark gray—correlations that are moderate (0.40–0.59)

Black—correlations that are strong (>0.59)

[a] These scores are from the raw cognitive/social behavior subscales in the Leiter International Performance Scale (revised edition in 2014–2015 and third edition in 2019).

[b] Executive function was measured by pencil-tapping in 2014–2015 and the Minnesota Executive Function Scale App (MEFS App$_{TM}$) in 2019.

[c] Receptive vocabulary was measured by the Growth Score Value on the Peabody Picture Vocabulary Test (PPVT–4 in 2014–2015 and PPVT–5 in 2019).

[d] Expressive vocabulary was measured by the raw score on the Expressive One-Word Picture Vocabulary Test (EOWPVT–4).

[e] These skills were measured with W scores from the Woodcock-Johnson (WJ) Tests of Achievement Spelling, Letter-Word Identification, and Applied Problems subscales

 (WJ III in 2014–2015 and WJ IV in 2019).

NA = not available.

Table 5. Correlations between teacher-reported literacy skills and other assessments, within each time point

Teacher-reported scales		Assessor-reported cognitive/social behavior and directly assessed executive function					Directly assessed language and cognitive skills				
Scale and time point	Literacy skills	Sociability[a]	Activity[a]	Attention[a]	Organization[a]	Executive function[b]	Receptive vocabulary[c]	Expressive vocabulary[d]	Early writing[e]	Letter-word knowledge[e]	Early math[e]
Literacy skills (fall 2014)	**0.50**	0.28	0.25	0.35	0.32	0.33	**0.45**	**0.45**	**0.57**	**0.61**	**0.50**
Literacy skills (spring 2015)	**0.50**	0.22	0.26	0.32	0.29	0.38	**0.42**	**0.45**	**0.60**	**0.65**	**0.50**
Literacy skills (fall 2019)	**0.63**	0.19	0.26	0.40	0.36	0.11	0.39	**0.48**	**0.58**	**0.57**	**0.58**
Literacy skills (spring 2020)	**0.59**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Source: Fall 2014, Spring 2015, Fall 2019, and Spring 2020 FACES Teacher Child Report and Fall 2014, Spring 2015, and Fall 2019 FACES Direct Child Assessment.

Note: Statistics are weighted to represent all children who were enrolled in Head Start in the fall and were still enrolled in the spring. All correlations in this table are statistically significant at $p \leq 0.05$.

Shading key

Light gray—correlations that are weak (<0.40)

Dark gray—correlations that are moderate (0.40–0.59)

Black—correlations that are strong (>0.59)

[a] These scores are from the raw cognitive/social behavior subscales in the Leiter International Performance Scale (revised edition in 2014–2015 and third edition in 2019).

[b] Executive function was measured by pencil-tapping in 2014–2015 and the Minnesota Executive Function Scale App (MEFS App$_{TM}$) in 2019.

[c] Receptive vocabulary was measured by the Growth Score Value on the Peabody Picture Vocabulary Test (PPVT–4 in 2014–2015 and PPVT–5 in 2019).

[d] Expressive vocabulary was measured by the raw score on the Expressive One-Word Picture Vocabulary Test (EOWPVT–4).

[e] These skills were measured with W scores from the Woodcock-Johnson (WJ) Tests of Achievement Spelling, Letter-Word Identification, and Applied Problems subscales (WJ III in 2014–2015 and WJ IV in 2019).

NA = not available.

Is there bias in how teachers rate certain groups of children on approaches to learning or literacy skills?

Teacher reports might be subject to bias if teachers rate certain children as systematically better or worse based on children's background characteristics. To understand whether there might be bias in using teacher reports in spring 2020, we examined bias in spring 2015 when both teacher reports and direct assessments were available. We examined the teacher-reported scales, and the most similar skill from the direct child assessment (assessor-reported attention for approaches to learning and directly assessed letter-word knowledge for literacy skills; see Box 2). Accounting for fall 2014 scores, we examined whether these skills are associated with children's primary home language, sex, age, and race or ethnicity in spring 2015. If teacher-reported scales are associated with children's characteristics but the corresponding skills from the direct child assessment are not, this would indicate potential bias in teacher ratings. We also examined whether there are differences in how teachers rated children from different groups in spring 2020 compared with spring 2015. We cannot determine bias in spring 2020 directly, but differences from spring 2015 might suggest that teachers rate children differently when they have less in-person exposure to children.

In spring 2015, there is some evidence of bias in teacher-reported approaches to learning for children whose primary home language was English, but not for sex, age, or race or ethnicity.

/ After accounting for fall scores, English primary home language is associated with lower teacher-reported approaches to learning scores (Table 6). However, English primary home language is not associated with assessor-reported attention in spring 2015, which provides some evidence there is bias in how teachers are rating these children on approaches to learning. This is consistent with past research that found that immigrant children receive better teacher reports of classroom behavior (Crosnoe 2006). On the other hand, as

discussed earlier, assessor-reported attention is not strongly associated with teacher-reported approaches to learning. Therefore, patterns for groups of children might vary because of differences in the assessments and the contexts for the assessments.

/ Being male is associated with lower teacher-reported approaches to learning scores after accounting for fall scores. Being male is also associated with lower assessor-reported attention scores, suggesting this pattern is not unique to teacher reports.

/ Age is associated with higher teacher-reported approaches to learning scores after accounting for fall scores. Age is also associated with higher assessor-reported attention scores. These findings are consistent with older children having stronger skills than younger children.

/ Race or ethnicity is not associated with teacher-reported approaches to learning after accounting for fall scores. Race or ethnicity is generally not associated with assessor-reported attention scores.[7]

Because of potential bias when examining fall to spring teacher reports of approaches to learning for children whose primary home language is English, primary home language should be included as a covariate in analyses predicting approaches to learning.

The associations of child background characteristics with teacher-reported approaches to learning are weaker in spring 2020 than spring 2015. In spring 2020, there are no significant associations between primary home language, sex, or age with approaches to learning. The effect sizes, though, are similar in size to spring 2015 for English primary home language and age. Differences between spring 2015 and 2020 could be because (a) the sample size is smaller in spring 2020, (b) these are different samples of children, or (c) teachers are assigning scores differently for groups of children in the context of virtual learning.

Table 6. Associations between children's characteristics and approaches to learning and attention scores, FACES 2014 and 2019

| | Spring 2020 | | Spring 2015 | | | |
| | Teacher-reported approaches to learning | | Teacher-reported approaches to learning | | Assessor-reported attention[a] | |
Predictor	Effect size	SE	Effect size	SE	Effect size	SE
Fall 2019 teacher-reported approaches to learning	0.64***	0.04	n.a.	n.a.	n.a.	n.a.
Fall 2014 teacher-reported approaches to learning	n.a.	n.a.	0.59***	0.03	n.a.	n.a.
Fall 2014 assessor-reported attention	n.a.	n.a.	n.a.	n.a.	0.39***	0.03
English primary home language	–0.11	0.11	–0.12*	0.06	–0.00	0.08
Male child	–0.05	0.07	–0.18***	0.04	–0.13*	0.05
Child age in months in fall	0.01	0.01	0.01***	0.00	0.02***	0.00
Child race/ethnicity (ref: White, non-Hispanic/Latino)						
Black, non-Hispanic/Latino	0.09	0.12	–0.08	0.08	0.07	0.10
Hispanic/Latino	0.04	0.13	–0.02	0.07	0.01	0.09
Other, non-Hispanic/Latino[b]	0.20	0.15	0.02	0.09	0.24*	0.11

Source: Fall 2014, Spring 2015, Fall 2019, and Spring 2020 FACES Teacher Child Report; Fall 2014, Spring 2015, Fall 2019, and Spring 2020 FACES Parent Survey; and Fall 2014 and Spring 2015 FACES Direct Child Assessment.
Note: Statistics are weighted to represent all children who were enrolled in Head Start in the fall and were still enrolled in the spring. We indicate statistical significance using the following convention: * $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$. The effect size is the regression coefficient based on standardizing spring and fall scores to have a mean of 0 and a standard deviation of 1. Ref = reference category. The reference category is the comparison group for the other categories listed in the table to examine differences in assessment scores.
[a] Attention was measured with the Leiter International Performance Scale raw score (revised edition in 2014–2015 and third edition in 2019).
[b] Other, non-Hispanic includes American Indian or Alaska Native, non-Hispanic (0.6 percent); Asian or Pacific Islander, non-Hispanic (2.4 percent); multiracial/biracial, non-Hispanic (7.2 percent); and respondents who noted a language or religion (rather than a race or ethnicity) or who did not fit into a category (0.2 percent).
n.a. = not applicable; SE = standard error.

In spring 2015, there is some evidence of bias in teacher-reported literacy skills for male children, but not for primary home language, age, or race or ethnicity.

/ After accounting for fall scores, being male is associated with lower teacher-reported literacy skills scores. However, this pattern is not observed for children's directly assessed letter-word knowledge (Table 7). This provides some evidence that teachers are biased in how they are rating male children's literacy skills. This could be because male children talk less in the classroom and teachers have fewer chances to observe their literacy skills (Leaper and Smith 2004).

/ Age is associated with higher teacher-reported literacy skills scores after accounting for fall scores. Age is also associated with higher directly assessed letter-word knowledge scores. These findings are consistent with older children having stronger skills than younger children.

/ Teacher-reported literacy skills and directly assessed letter-word knowledge are not associated with primary home language or race or ethnicity, after accounting for fall scores.

Because of potential bias when examining fall to spring teacher reports of literacy skills for male children, child sex should be included as a covariate in analyses predicting literacy skills.

The associations of child background characteristics with teacher-reported literacy skills are weaker in spring 2020 than spring 2015. In spring 2020, there are no significant associations between sex or age and literacy skills. Similar to approaches to learning, there are multiple potential explanations for the differences in findings between spring 2015 and 2020.

Table 7. Associations between children's characteristics and literacy skills and letter-word knowledge, FACES 2014 and 2019

Predictor	Spring 2020 Teacher-reported literacy skills		Spring 2015 Teacher-reported literacy skills		Spring 2015 Directly assessed letter-word knowledge[a]	
	Effect size	SE	Effect size	SE	Effect size	SE
Fall 2019 teacher-reported literacy skills	0.74***	0.02	n.a.	n.a.	n.a.	n.a.
Fall 2014 teacher-reported literacy skills	n.a.	n.a.	0.63***	0.02	n.a.	n.a.
Fall 2014 directly assessed letter-word knowledge	n.a.	n.a.	n.a.	n.a.	0.70***	0.02
English primary home language	–0.04	0.10	–0.10	0.07	–0.01	0.07
Male child	–0.01	0.06	–0.14***	0.04	–0.03	0.04
Child age in months in fall	0.01	0.01	0.03***	0.00	0.01***	0.00
Child race/ethnicity (ref: White, non-Hispanic/Latino)						
Black, non-Hispanic/Latino	0.00	0.11	–0.08	0.07	0.04	0.07
Hispanic/Latino	–0.09	0.11	–0.12	0.07	0.00	0.07
Other, non-Hispanic/Latino[b]	0.00	0.13	–0.11	0.07	0.05	0.08

Source: Fall 2014, Spring 2015, Fall 2019, and Spring 2020 FACES Teacher Child Report; Fall 2014, Spring 2015, Fall 2019, and Spring 2020 FACES Parent Survey; and Fall 2014 and Spring 2015 FACES Direct Child Assessment.

Note: Statistics are weighted to represent all children who were enrolled in Head Start in the fall and were still enrolled in the spring. We indicate statistical significance using the following convention: * $p \le 0.05$, ** $p \le 0.01$, *** $p \le 0.001$. The effect size is the regression coefficient based on standardizing spring and fall scores to have a mean of 0 and a standard deviation of 1. Ref = reference category. The reference category is the comparison group for the other categories listed in the table to examine differences in assessment scores.

[a] Letter-word knowledge was measured with the Woodcock-Johnson Tests of Achievement Letter-Word Identification subtest (WJ III in 2014–2015 and WJ IV in 2019).

[b] Other, non-Hispanic includes American Indian or Alaska Native, non-Hispanic (0.6 percent); Asian or Pacific Islander, non-Hispanic (2.4 percent); multiracial/biracial, non-Hispanic (7.2 percent); and respondents who noted a language or religion (rather than a race or ethnicity) or who did not fit into a category (0.2 percent).

n.a. = not applicable; SE = standard error.

Conclusions

Overall, teacher-reported approaches to learning and literacy skills have strong measurement properties among Head Start children. There is evidence of the scales' validity from this study and prior studies (Duncan et al. 2007). Therefore, these teacher reports could be used as outcome measures in analyses using FACES data when the direct child assessment is not available, such as during the COVID-19 pandemic. Teacher-reported literacy skills could be used as a proxy for directly assessed language and cognitive skills, especially letter-word knowledge. The approaches to learning scale cannot be used as a proxy for cognitive/social behavior or directly assessed executive function because of weak associations with these assessments. Nonetheless, it could be examined as one aspect of early learning that is linked to later achievement (Duncan et al. 2007).

However, there are limitations to using these teacher reports in analyses of FACES 2019 data. There is some evidence of bias in teacher reports in spring 2015. Therefore, child background characteristics, including primary home language and child sex, should be included in analyses of FACES 2019. Children in spring 2020 also had different experiences because of the COVID-19 pandemic. Teachers had different opportunities to observe children depending on how long in-person learning was allowed in a given locale. Finally, teachers did not report on all the skills measured by the direct child assessment so we have a more limited picture of children's early learning skills.

Nonetheless, teacher reports of children's early learning skills might be useful when it is difficult to assess children directly, such as during the COVID-19 pandemic. Future research should continue to explore the appropriateness of using teacher reports, especially when children are learning virtually. For example, does it matter how much in-person contact teachers had with children? Given many children have been learning at home, do parent reports offer useful information instead of, or in addition to, teacher reports? Can teachers reliably and validly report on other child outcomes? The most appropriate assessment and reporter will vary depending on the context, purpose, and outcomes of interest.

Head Start FACES

FACES provides information at the national level about Head Start programs, centers, and classrooms and about the children and families that Head Start serves.

Head Start is a national program that helps young children from families with low incomes get ready to succeed in school. It works to promote their early learning, health, and nutrition and their family's well-being. Head Start connects families with medical, dental, and mental health services to be sure that children are receiving the services they need to develop well. Head Start also tries to involve parents in their children's learning and development, and to help parents make progress on their own goals, such as housing stability, continuing education, and financial security (Administration for Children and Families 2020). Head Start operates by providing grants to local public and private nonprofit and for-profit agencies. The agencies in turn deliver comprehensive children's development services to children and families who are economically disadvantaged.

Sample

To examine teacher-reported approaches to learning and literacy skills, we conducted analyses using data collected in fall 2019 and spring 2020 from FACES 2019, as well as data collected in fall 2014 and spring 2015 from FACES 2014.

For FACES 2014, we selected a sample of Head Start programs from the 2012–2013 Head Start Program Information Report, with two centers per program and two classrooms per center. Within each classroom, we randomly selected 12 children for the study. In total, 60 programs, 119 centers, 247 classrooms, and 2,462 children participated in the study in fall 2014. The sample used for this brief included 1,921 children who had parent survey data in fall 2014 or spring 2015 in combination with data from either a teacher child report or direct child assessment in fall 2014 and spring 2015. All findings were weighted to represent children who were still enrolled in spring. More information on the study methodology and measurement in FACES 2014 is available in the FACES 2014–2015 Data Tables and Study Design report (Aikens et al. 2017).

For FACES 2019, we selected a sample of Head Start programs from the 2017–2018 Head Start Program Information Report, with two centers per program and two classrooms per center. Within each classroom, we randomly selected 12 children for the study. In total, 59 programs, 115 centers, 221 classrooms, and 2,260 children participated in the study in fall 2019. The sample used for this brief included 1,162 children who had parent survey data in fall 2019 or spring 2020 in combination with teacher child report data in fall 2019 and spring 2020. All findings were weighted to represent children who were still enrolled in spring. More information on the study methodology and measurement in FACES 2019 is available in the FACES Fall 2019 Data Tables and Study Design (Kopack Klein et al. 2021) and FACES Spring 2020 Data Tables and Study Design Report (Doran et al. 2022a).

More information on the sample used for the analyses in this brief is in the technical report (Nguyen et al. 2022).

Appendix

Table A.1. Teacher-reported scale items

Item	Response option
Literacy skills	
How often does [CHILD] like to write or pretend to write?	Never Has done it once or twice Sometimes Often
Does [CHILD] mostly write and draw rather than scribble?	Yes/no
Can [CHILD] write [his/her] first name even if some of the letters are backward?	Yes/no
Can [CHILD] recognize…	All of the letters of the alphabet Most of them Some of them None of them
Does [CHILD] recognize [his/her] own first name in writing or in print?	Yes/no
Can [CHILD] demonstrate a beginning understanding of the relationship between sounds and letters (e.g., the letter B makes a "buh" sound)?	Not at all For one or two letters For a few (up to 5) letters For several (6 or more) letters
Does [CHILD] read any other words in writing or in print?	Yes/no
Can [CHILD] identify rhyming words?	Yes/no
Approaches to learning	
Please describe [CHILD] according to how [he/she] approaches tasks. How often *in the past month* did [he/she] act this way? Keeps belongings organized Pays attention well Shows eagerness to learn new things Easily adapts to changes in routine Persists in completing tasks Works independently	Never Sometimes Often Very often

Source: Fall 2014, Spring 2015, Fall 2019, and Spring 2020 FACES Teacher Child Report.

Note: Approaches to learning items are from the Early Childhood Longitudinal Study, Kindergarten (ECLS–K; U.S. Department of Education 2002). Literacy skills items are adapted from the National Household Education Survey (U.S. Department of Education 2000). The Teacher Child Report also includes teacher ratings of children's social skills and problem behaviors and physical health and development.

Endnotes

[1] COVID-19 was declared a pandemic by the World Health Organization and a public health emergency by the U.S. Centers for Disease Control and Prevention (CDC 2020) in spring 2020.

[2] In 2019, the FACES direct child assessment switched from a pencil-tapping task to measure executive function to the Minnesota Executive Function Scale (MEFS App™) and updated to the latest edition for the Woodcock-Johnson (WJ) Tests of Achievement (changed from the WJ III to the WJ IV) and the Peabody Picture Vocabulary Test (PPVT); (changed from the PPVT–4 to the PPVT–5). See the technical report for discussion of how correlations with the teacher-reported scales are generally similar for these different direct assessments (Nguyen et al. 2022).

[3] Items for the teacher-reported literacy skills scale had different response options. We used a Rasch model to construct the scale. Rasch scores represent the difficulty of the items and children's ability on the measured skills. We anchored all the time points on the difficulty of the items from spring 2015 data, because by then teachers might be expected to have had the most contact and experience with the children, enabling them to accurately rate children's skills. We transformed the Rasch scores to W scores that allow measurement of change or growth in performance on the same scale over time. We report the mean of the items for the approaches to learning scale.

[4] We compared FACES 2014 and FACES 2019 data by conducting independent sample t-tests comparing teacher-reported scores from each time point in FACES 2014 to the same time point in FACES 2019.

[5] We categorized correlations of 0.40–0.59 as moderate, correlations of smaller magnitude as weak, and correlations of greater magnitude as strong (Evans 1996).

[6] We restricted the sample to children who had all variables for analysis of each pair of assessments (teacher-reported approaches to learning and assessor-reported attention; teacher-reported literacy skills and directly assessed letter-word knowledge) to make the samples consistent for examination of teacher bias. Children included in the analyses of teacher-reported literacy skills and directly assessed letter-word knowledge were assessed in English at both time points.

[7] Children from other, non-Hispanic/Latino races or ethnicities receive higher attention scores than White, non-Hispanic/Latino children. We did not draw conclusions based on this finding because the other, non-Hispanic/Latino category is small and consists of a diverse group of children: American Indian or Alaska Native, non-Hispanic children (0.6 percent); Asian or Pacific Islander, non-Hispanic children (2.4 percent); multiracial/biracial, non-Hispanic children (7.2 percent); and respondents who noted a language or religion (rather than a race or ethnicity) or who did not fit into a category (0.2 percent).

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