A Technical Report

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This technical report provides information on the development and psychometric properties of the observational measure *Parenting Interactions with Children: Checklist of Observations Linked to Outcomes (PICCOLO).* PICCOLO was developed at Utah State University in Logan, Utah, with funding from the Administration for Children, Youth, and Families of the U.S. Department of Health and Human Services (Grant #90YF0500) and from a Community University Research Initiative grant from Utah State University.

After an overview of the instrument, the demographic characteristics of the samples used to develop PICCOLO are described. Then, the development of PICCOLO is discussed, including item selection, item analyses, and psychometrics. Next, descriptive statistics and information are provided about the measure's reliability, including interrater reliability and scale internal consistency. Finally, validity analyses are reported that include content validity ratings along with construct validity and predictive validity correlations.

OVERVIEW OF PICCOLO™

PICCOLO is an observational instrument to measure positive parenting. PICCOLO was developed to be easy to learn and practical to use by practitioners working with parents of young children. Psychometric data support PICCOLO as a measure that is reliable and valid. The PICCOLO domains are based on early child development theory and research suggesting critical dimensions of parent–child interactions that promote children's development in social, language, and cognitive domains. These domains include parenting behaviors indicative of affection, responsiveness, encouragement, and teaching.

Indicator items in each of these domains were observed and evaluated on more than 4,500 video-recorded observations of parents interacting with their children ages 10–47 months. The PICCOLO domain indicators describe specific interactions between parents and children at home; scoring is not determined by the presence of specific toys or materials. This distinction between observed interactions and physical toys or materials is important because in some parenting programs, materials and specific activities may be emphasized more than parent–child interactions. In PICCOLO, the focus is on what parents *do* with the materials they have and in the activities they engage in with their children.

SAMPLES FROM STUDIES PROVIDING OBSERVATION DATA

The information included in this technical report is drawn from extant observations and data from two research samples. Observations were not included if the family used a language other than English or Spanish or if the video recording was damaged, unclear, or missing. Each of these samples is described briefly next.

Early Head Start Research

Study summary: The Early Head Start (EHS) Research and Evaluation Project included 17 program sites from across the country and was funded by the Administration for Children and Families in the U.S. Department of Health and Human Services to evaluate local EHS programs serving low-income families with children from before birth to age 3 years. This program included both center-based and home-based services.

Number of programs: 17

Number of participants: 3,001

Observation procedure: Children were observed with their primary caregiver at 14, 24, and 36 months of age. The observations consisted of a 10-minute, three-bag semistructured play interaction in which the parent was presented with three bags of play materials (the first bag with a book, the second bag with pretend toys, and the third bag with other toys) and asked to play with the child for 10 minutes using the bags in numerical order, dividing the time however they wanted. Of the 3,001 families (cases) in this study, 2,287 had one or more video-recorded observations of parent–child interactions (clips); of those, 1,986 families had at least one observation coded, with a total of 4,516 clips coded.

Bilingual Early Language and Literacy Supports

Study summary: The Bilingual Early Language and Literacy Supports (BELLS) project tested language and emergent literacy outcomes of bilingual children participating in a program that serves low-income Hispanic children from birth through preschool in Utah. This program included both early English immersion and home language and literacy support.

Number of programs: 1

Number of participants: 112

Observation procedure: Children were observed with their primary caregiver at 14, 24, and 36 months of age. The observations consisted of a 15-minute two-bag play interaction (the first bag with books and the second bag with pretend toys); caregivers were asked to play with the child for 15 minutes using the bags in numerical order, dividing the time however they wanted. Of the 112 families in the sample, 62 had one or more video-recorded observations that were coded. (Attrition in this study was high due to family mobility.)

PICCOLO™ SAMPLE DESCRIPTION

Table A.1 shows the total number of families and observations from the samples described previously that were used to develop PICCOLO. These data are not intended to be nationally representative. Depending on the analytic question, either observations or families were used as the unit of analysis. The headings in the table refer to how that aspect of the sample was used in measurement development. *Reliability N* refers to the sample used to test interrater reliability across all observations scored by two or more observers. *Scale N* refers to the sample used to test scale reliability and construct validity across all observations scored by at least one observer. *Validity N* refers to the sample used to test predictive validity in cases with observations scored by at least two observers and with outcome data from children's developmental assessments at a later time point. *Descriptive N* refers to the sample used to describe the range, means, and standard deviations of PICCOLO domain and total scores at each age.

The sample from the EHS study represents low-income families of European American, African American, and Latino American ethnicities who applied for the EHS program. The sample from the BELLS study provides additional observations from low-income families of primarily Latino American ethnicity. Demographic and descriptive data reported in this section come from questionnaires completed by parents of these children.

Demographic Characteristics of Sample

The overall sample consists of 38% European American, 39% African American, and 23% Latino American families. The following tables show additional key demographic characteristics of the sample. Tables A.2 and A.3 show the proportion of family ethnicity at each level of maternal education and age.

MEASUREMENT DEVELOPMENT PROCESS

The following sections describe the methodological procedures for developing the PICCOLO measure.

Table A.1. Sample of families and observations used to develop Parenting Interactions with Children: Checklist of Observations Linked to Outcomes (PICCOLO™)

	Families		Observations	
	Validity *N*[a]	Descriptive *N*[b]	Reliability *N*[c]	Scale *N*[d]
	2+ coders	1+ coders	2+ coders	1+ coders
European American	731	788	757	1,981
African American	727	792	938	1,697
Latino American	365	468	674	920
TOTAL	1,823	2,048	2,369	4,598

[a]Validity *N*, number of families with at least one video observation coded by two observers and child outcome data at a later age point.

[b]Descriptive *N*, number of families with at least one video observation coded by at least one observer.

[c]Reliability *N*, number of video observations coded by at least two observers.

[d]Scale *N*, number of video observations coded by at least one observer.

Table A.2. Percentage of sample by maternal education within each ethnicity

Education	European American (%)	African American (%)	Latino American (%)	Total (%)
Less than HS	31	48	65	45
HS or GED	39	29	20	31
HS + additional education	30	23	14	24

Key: GED, obtained general equivalency diploma; HS, completed high school.

Table A.3. Percentage of sample by maternal age within each ethnicity

Age	European American (%)	African American (%)	Latino American (%)	Total (%)
Teen mother	32	53	31	39
≧ 20 years old	68	48	69	61

Item Development

PICCOLO items were developed and identified initially by examining several sources. First, we examined definitions of constructs indicated in the research literature as linked to child outcomes and constructs central to major theories of child development. Second, we examined definitions of constructs we have found in our previous research to be linked to child outcomes in Head Start, EHS, and other low-income populations. Third, we examined other existing observational measures of parent–child interaction, such as instruments widely used in the research literature. These instruments included Home Observation for Measurement of the Environment (HOME; Caldwell & Bradley, 1984); NCAST (Barnard & Kelly, 1990; Summer & Spietz, 1995); Maternal Behavior Q-set (Pederson & Moran, 1995); and assessment tools used by our Head Start program partners, such as the indicators described as interactive behaviors in the Hawaii Early Learning Profile (HELP; Parks, 1997), to identify behavioral indicators of positive parent–child interaction. Measures used for this purpose have established psychometric properties and are appropriate for low-income families from culturally and linguistically diverse groups. Finally, we reviewed with our Head Start program partners their program documentation, stated objectives, and intended outcomes for parent–child relationships. We used these program materials to identify additional potential behavioral indicators that would be important for these and similar programs.

All possible items were reviewed, and redundant items were combined or eliminated. Approximately 200 item "candidates" were evaluated by the research team and by additional colleagues for clarity and relevance to parent–child relationships and children's developmental outcomes. Any items describing abstract or complex aspects of parenting or parent–child interaction were not included unless they could be reworded to be concrete and parsimonious without losing their meaning. Items that could not be clarified in this way were eliminated. The remaining 112 items were selected for further work.

The clarity and usefulness of behavioral indicators ultimately rests with those who use them to assess parent–child interaction. After initially reviewing various sources described previously for appropriate items and clarifying the wording of items to make them as clear and concrete as possible, we received feedback from untrained observers about both the clarity and importance of each item. Some be-

haviors, even if clear and valued in the research literature, were neither clear nor important to nonresearchers.

EHS staff and parent volunteers ($n = 9$) were asked to rate the large set of identified and reworded items in two ways. *How clearly is the item defined*—Would you recognize the behavior if you saw it? *How important is the item*—How essential is it for children's development? These ratings were used to identify items that needed to be clarified and to reduce the number of items to be tested in the initial version of the measure. To ensure that items are useful and appropriate for Spanish-speaking families, items were professionally translated into Spanish (with back translation) and then evaluated separately by a group of Spanish-speaking staff and parent volunteers ($n = 4$).

After considering these ratings and reviews, 80 items were selected for testing through observations of archived video-recorded observations of parent–child interaction.

Item Selection

Teams of independent coders, recruited from undergraduate students in child development and psychology classes at Utah State University, tested the initial version of our checklist measure by coding observations from our video archive. Each student received 8–10 hours of training before observing video clips. Training included reading basic information about confidentiality protections, observational procedures, and parent–child interaction dimensions. To ensure that students understood the material they had read, each student was given a short quiz on the readings, and all students correctly answered at least 80% of the items before they were allowed to proceed. After training and certification in confidentiality procedures, students observed example video clips in small groups and discussed the observations with a member of the research team until reaching consensus. After passing a reliability test, students were assigned to code video clips. For assessing item reliability, two or more coders observed each video-recorded observation. For assessing predictive validity, at least two reliable coders observed each video-recorded observation.

Multiple criteria were used to select the final PICCOLO items based on 1) variability across individual cases, 2) reliability of raters, 3) scale reliability within domains, 4) construct validity with extant parenting measures, 5) predictive validity with extant child outcome data, 6) content validity from the importance ratings from program partners, and 7) qualitative feedback from raters and partners. Variability is shown in Table A.4.

RELIABILITY

Reliability refers to the degree to which the instrument is free from random error associated with the process of measuring the construct of interest. One step in minimizing random error in PICCOLO involves training materials that provide potential observers with a clear and comprehensive understanding of the instrument's purposes and procedures.

Training Observers

As part of the PICCOLO training, trainees read about the content and purpose of the measure (3 hours) and then watched and discussed five 10-minute video-

Table A.4. Descriptive statistics on Parenting Interactions with Children: Checklist of Observations Linked to Outcomes (PICCOLO™) at child age 14 months (n = 1,587), 24 months (n = 1,504), and 36 months (n = 1,401)

Descriptive statistics	Minimum	Maximum	Mean total score	Total score standard deviation
Affection				
14 months	1.17	14.00	10.91	2.01
24 months	2.50	14.00	10.75	2.09
36 months	1.00	14.00	10.45	2.07
Responsiveness				
14 months	0.00	14.00	10.63	2.16
24 months	1.75	14.00	11.27	2.06
36 months	1.40	14.00	11.29	2.06
Encouragement				
14 months	1.00	14.00	9.65	2.36
24 months	1.00	14.00	10.36	2.32
36 months	0.00	14.00	10.19	2.30
Teaching				
14 months	0.00	16.00	7.35	2.79
24 months	0.00	16.00	8.70	2.83
36 months	0.00	16.00	8.61	2.79
PICCOLO total				
14 months	7.48	58.00	38.53	7.66
24 months	12.26	58.00	41.09	7.77
36 months	6.09	58.00	40.54	7.68

Note: Statistics are based on descriptive sample of 2,048 families, with any scores by multiple coders averaged together; data from child age 10 months not included.

recorded segments previously observed by at least three expert observers who coded by consensus (3 hours). The consensus ratings established a standard by which to judge the accuracy of ratings made by trainees, and ratings that were not in agreement were then used to pinpoint additional training needs. At the end of training, potential users took a reliability test in which they watched and coded three to five additional 10-minute video-recorded observations to reach a level of 80% agreement with research team ratings (2–4 hours).

Interrater Reliability

To assess interrater reliability of the PICCOLO items, independently coded video-recorded observations were compared between two observers. The mean proportion of absolute agreement across observations is shown for each PICCOLO item and domain in Tables A.5–A.8. The mean interrater correlation is shown for each domain and the total score in Table A.9.

Interrater Reliability by Ethnicity

To assess cross-cultural reliability of the PICCOLO items, independently coded video-recorded observations were compared between observers of different ethnicities.

Table A.5. Domain 1: Affection

Item	Average interrater agreement
1. Speaks in a warm tone of voice	0.89
2. Smiles at child	0.68
3. Praises child	0.70
4. Is physically close to child	0.95
5. Uses positive expressions with child	0.73
6. Is engaged in interacting with child	0.87
7. Shows emotional warmth	0.69
Total = 7 items	**0.80**

Table A.6. Domain 2: Responsiveness

Item	Average interrater agreement
1. Pays attention to what child is doing	0.92
2. Changes pace or activity to meet child's interests or needs	0.67
3. Is flexible about child's change of activities or interests	0.78
4. Follows what child is trying to do	0.73
5. Responds to child's emotions	0.64
6. Looks at child when child talks or makes sounds	0.76
7. Replies to child's words or sounds	0.78
Total = 7 items	**0.76**

Table A.7. Domain 3: Encouragement

Item	Average interrater agreement
1. Waits for child's response after making a suggestion	0.61
2. Encourages child to handle toys	0.90
3. Supports child in making choices	0.72
4. Supports child in doing things on his or her own	0.82
5. Verbally encourages child's efforts	0.67
6. Offers suggestions to help child	0.67
7. Shows enthusiasm about what child is doing	0.70
Total = 7 items	**0.73**

Table A.8. Domain 4: Teaching

Item	Average interrater agreement
1. Explains reasons for something to child	0.76
2. Suggests activities to extend what child is doing	0.61
3. Repeats or expands child's words or sounds	0.67
4. Labels objects or actions for child	0.74
5. Engages in pretend play with child	0.66
6. Does activities in a sequence of steps	0.71
7. Talks to child about characteristics of objects	0.69
8. Asks child for information	0.68
Total = 8 items	**0.69**

Table A.9. Interrater reliability correlations

Domain	Reliability with another coder
Affection	.80
Responsiveness	.74
Encouragement	.77
Teaching	.76
PICCOLO Total	**.77**

Key: PICCOLO™, Parenting Interactions with Children: Checklist of Observations Linked to Outcomes.

Each video clip was originally coded by a coder of the same ethnicity as that of the parent. Coders included European Americans, African Americans, and Latinos. Spanish-speaking families were observed by native Spanish-speaking coders. More than 500 observations were coded by two or more observers from a culture different from that of the parent and the original coder. The mean proportion of agreement by culture is shown for each domain in Table A.10.

Table A.10. Cross-ethnicity reliability correlations by domain

Domain	Coder ethnicity	Reliability with coders of another ethnicity
Affection		**.78**
	European American	.82
	African American	.76
	Latino	.75
Responsiveness		**.68**
	European American	.73
	African American	.64
	Latino	.67
Encouragement		**.66**
	European American	.72
	African American	.60
	Latino	.67
Teaching		**.75**
	European American	.79
	African American	.73
	Latino	.72
PICCOLO Total		**.80**
	European American	.81
	African American	.82
	Latino	.76

Key: PICCOLO™, Parenting Interactions with Children: Checklist of Observations Linked to Outcomes.

Scale Reliability

PICCOLO was developed using a theoretical framework suggesting four major domains of parenting behaviors: Affection (warmth, care), Responsiveness (sensitivity), Encouragement (scaffolding, autonomy support), and Teaching (cognitive stimulation, language and literacy support). To test the degree to which data from actual parent–child interactions matched this theoretical framework, we conducted both internal consistency and confirmatory factor analyses on the data. Tables A.11–A.14 show the item descriptions and internal consistency statistics for items within each domain. Table A.15 presents the results of the confirmatory factor analyses. Within each domain, factor loadings are in the moderate to high range, consistent with internal consistency within each domain. Given the factor loadings, the internal

Table A.11. Internal consistency of the Affection domain (scale *alpha* = .78)

Item	Corrected item–total correlation	Cronbach's *alpha* if item deleted
1. Speaks in a warm tone of voice	.57	.75
2. Smiles at child	.54	.76
3. Praises child	.42	.79
4. Is physically close to child	.29	.79
5. Uses positive expressions with child	.75	.70
6. Is engaged in interacting with child	.55	.75
7. Shows emotional warmth	.63	.73

Table A.12. Internal consistency of the Responsiveness domain (scale *alpha* = .75)

Item	Corrected item–total correlation	Cronbach's *alpha* if item deleted
1. Pays attention to what child is doing	.45	.73
2. Changes pace or activity to meet child's interests or needs	.45	.72
3. Is flexible about child's change of activities or interests	.49	.71
4. Follows what child is trying to do	.60	.68
5. Responds to child's emotions	.47	.71
6. Looks at child when child talks or makes sounds	.45	.72
7. Replies to child's words or sounds	.41	.73

Table A.13. Internal consistency of the Encouragement domain (scale *alpha* = .77)

Item	Corrected item–total correlation	Cronbach's *alpha* if item deleted
1. Waits for child's response after making a suggestion	.49	.74
2. Encourages child to handle toys	.46	.75
3. Supports child in making choices	.49	.74
4. Supports child in doing things on his or her own	.45	.75
5. Verbally encourages child's efforts	.52	.73
6. Offers suggestions to help child	.50	.74
7. Shows enthusiasm about what child is doing	.57	.72

Table A.14. Internal consistency of the Teaching domain (scale *alpha* = .80)

Item	Corrected item–total correlation	Cronbach's *alpha* if item deleted
1. Explains reasons for something to child	.53	.77
2. Suggests activities to extend what child is doing	.55	.77
3. Repeats or expands child's words or sounds	.45	.78
4. Labels objects or actions for child	.53	.77
5. Engages in pretend play with child	.48	.78
6. Does activities in a sequence of steps	.52	.77
7. Talks to child about characteristics of objects	.48	.78
8. Asks child for information	.51	.77

Table A.15. Confirmatory factor analysis results for single factor in each domain

Items in each domain	Factor loadings
Affection	
1. Speaks in a warm tone of voice	.74
2. Smiles at child	.67
3. Praises child	.54
4. Is physically close to child	.43
5. Uses positive expressions with child	.86
6. Is engaged in interacting with child	.71
7. Shows emotional warmth	.78
Responsiveness	
1. Pays attention to what child is doing	.62
2. Changes pace or activity to meet child's interests or needs	.64
3. Is flexible about child's change of activities or interests	.67
4. Follows what child is trying to do	.78
5. Responds to child's emotions	.64
6. Looks at child when child talks or makes sounds	.58
7. Replies to child's words or sounds	.55
Encouragement	
1. Waits for child's response after making a suggestion	.65
2. Encourages child to handle toys	.64
3. Supports child in making choices	.68
4. Supports child in doing things on his or her own	.64
5. Verbally encourages child's efforts	.65
6. Offers suggestions to help child	.62
7. Shows enthusiasm about what child is doing	.70
Teaching	
1. Explains reasons for something to child	.67
2. Suggests activities to extend what child is doing	.69
3. Repeats or expands child's words or sounds	.58
4. Labels objects or actions for child	.67
5. Engages in pretend play with child	.62
6. Does activities in a sequence of steps	.66
7. Talks to child about characteristics of objects	.62
8. Asks child for information	.65

Table A.16. Correlations among domains at 14 months (n = 1,587)

Domain	Affection	Responsiveness	Encouragement	Teaching
Affection	1.00	—	—	—
Responsiveness	.61	1.00	—	—
Encouragement	.73	.68	1.00	—
Teaching	.53	.35	.57	1.00

Note: All correlations are significant at $p < .001$.

Table A.17. Correlations among domains at 24 months (n = 1,504)

Domain	Affection	Responsiveness	Encouragement	Teaching
Affection	1.00	—	—	—
Responsiveness	.65	1.00	—	—
Encouragement	.72	.72	1.00	—
Teaching	.54	.44	.57	1.00

Note: All correlations are significant at $p < .001$.

Table A.18. Correlations among domains at 36 months (n = 1,401)

Domain	Affection	Responsiveness	Encouragement	Teaching
Affection	1.00	—	—	—
Responsiveness	.65	1.00	—	—
Encouragement	.71	.72	1.00	—
Teaching	.53	.43	.57	1.00

Note: All correlations are significant at $p < .001$.

consistency within all four domains, and the strong theoretical basis of each of these domains, we recommend the use of all four domains. As shown in Tables A.16–A.18, PICCOLO domains are moderately to highly correlated with one another, although less so over time and not at a level that would suggest that they measure the same construct.

Scale Stability

Another aspect of scale reliability is stability over time. As displayed in Tables A.19–A.22, the PICCOLO domains are moderately stable over time in that earlier scores predict later scores in the same domain. There are, nevertheless, changes over time in some domains. Tables A.23 and A.24 show t-test results from comparisons of

Table A.19. Stability correlations for the Affection domain (n = 1,055–1,174)

Age	14 months	24 months
14 months	1.00	—
24 months	.49	1.00
36 months	.39	.49

Note: All correlations significant at $p < .001$.

Table A.20. Stability correlations for the Responsiveness domain (n = 1,054–1,176)

Age	14 months	24 months
14 months	1.00	—
24 months	.40	1.00
36 months	.30	.39

Note: All correlations are significant at $p < .001$.

Table A.21. Stability correlations for the Encouragement domain (n = 1,055–1,174)

Age	14 months	24 months
14 months	1.00	—
24 months	.44	1.00
36 months	.36	.46

Note: All correlations are significant at $p < .001$.

Table A.22. Stability correlations for the Teaching domain (n = 1,055–1,176)

Age	14 months	24 months
14 months	1.00	—
24 months	.52	1.00
36 months	.41	.52

Note: All correlations are significant at $p < .001$.

Table A.23. Paired samples *t*-tests testing changes in scores between 14 and 24 months

Domain and child age	Item mean	*N*	Standard deviation	Standard error of the mean	*t*	Significance (2-tailed)
Affection 14 months	1.57	1,174	.28	.01	—	—
Affection 24 months	1.54	1,174	.30	.01	3.89	.00
Responsiveness 14 months	1.53	1,176	.31	.01	—	—
Responsiveness 24 months	1.61	1,176	.30	.01	–8.72	.00
Encouragement 14 months	1.39	1,174	.33	.01	—	—
Encouragement 24 months	1.49	1,174	.33	.01	–9.32	.00
Teaching 14 months	.93	1,176	.35	.01	—	—
Teaching 24 months	1.09	1,176	.36	.01	–15.34	.00

Note: Mean values are only for cases with video observations at both time points.

domain scores between adjacent time points, with most changes occurring between 14 and 24 months.

VALIDITY

Several aspects of validity were examined both to guide item selection and to assess the psychometric strength of the final measure. Validity concerns included *content*

Table A.24. Paired samples *t*-tests testing changes in scores between 24 and 36 months

Domain and child age	Item mean	*N*	Standard deviation	Standard error of the mean	*t*	Significance (2-tailed)
Affection 24 months	1.54	1,104	.30	.01	—	—
Affection 36 months	1.50	1,104	.30	.01	4.42	.00
Responsiveness 24 months	1.62	1,103	.29	.01	—	—
Responsiveness 36 months	1.61	1,103	.30	.01	0.25	.81
Encouragement 24 months	1.48	1,104	.33	.01	—	—
Encouragement 36 months	1.46	1,104	.33	.01	2.25	.03
Teaching 24 months	1.09	1,104	.36	.01	—	—
Teaching 36 months	1.08	1,104	.35	.01	0.67	.50

Note: Mean values are only for cases with video observations at both time points.

validity, the extent to which practitioners in the field perceived the measure as including items that were important for parenting; *construct validity,* the relations between the PICCOLO measure and an established observational measure of parenting; and *predictive validity,* the association of the PICCOLO measure with positive child outcomes. The following aspects of validity were examined:

- Content validity from importance ratings by practitioners
- Construct validity in relation to established observational measure of parenting
- Predictive validity in relation to measures of child outcomes

Content Validity

PICCOLO was developed based on an extensive literature review of parent–child interactions related to children's later cognitive and social development. The domains were developed from a review of items from observational instruments used in previous parenting research. Throughout this process, numerous experts in parent–child interactions have agreed that PICCOLO measures aspects of parenting that are important in determining child outcomes, suggesting considerable content validity.

The usefulness of PICCOLO for program staff was evaluated using trained practitioners in two home-based EHS programs and one other home visiting program. Practitioners used the measure and gave feedback on ease of use, meaningfulness, and appropriateness of the measure. Practitioners rated each item in terms of its importance in parenting, using a 0–3 scale with 0 = *not at all important,* 1 = *somewhat important,* 2 = *fairly important,* and 3 = *very important.* The average importance rating for the selected PICCOLO items was 2.6 versus 2.3 for those items that were eliminated. Tables A.25–A.28 show the importance ratings for items in each domain.

Construct Validity

Construct validity assesses the extent to which a measure is associated empirically with other measures of similar constructs. In the EHS Research and Evaluation Project, an established reliable and valid observational parenting measure (Berlin,

Table A.25. Affection domain: Content validity ratings

Descriptive statistics	Minimum	Maximum	Mean	Standard deviation
1. Speaks in a warm tone of voice	2.00	3.00	2.56	0.53
2. Smiles at child	1.00	3.00	2.44	0.73
3. Praises child	2.00	3.00	2.67	0.50
4. Is physically close to child	1.00	3.00	2.56	0.73
5. Uses positive expressions with child	2.00	3.00	2.89	0.33
6. Is engaged in interacting with child	3.00	3.00	3.00	0.00
7. Shows emotional warmth	3.00	3.00	3.00	0.00

Table A.26. Responsiveness domain: Content validity ratings

Descriptive statistics	Minimum	Maximum	Mean	Standard deviation
1. Pays attention to what child is doing	0.00	3.00	2.00	1.20
2. Changes pace or activity to meet child's interests or needs	2.00	3.00	2.50	0.53
3. Is flexible about child's change of activities or interests	2.00	3.00	2.75	0.46
4. Follows what child is trying to do	2.00	3.00	2.88	0.35
5. Responds to child's emotions	1.00	3.00	2.50	0.76
6. Looks at child when child talks or makes sounds	2.00	3.00	2.88	0.35
7. Replies to child's words or sounds	2.00	3.00	2.88	0.35

Table A.27. Encouragement domain: Content validity ratings

Descriptive statistics	Minimum	Maximum	Mean	Standard deviation
1. Waits for child's response after making a suggestion	2.00	3.00	2.78	0.44
2. Encourages child to handle toys	2.00	3.00	2.89	0.33
3. Supports child in making choices	2.00	3.00	2.89	0.33
4. Supports child in doing things on his or her own	1.00	3.00	2.56	0.73
5. Verbally encourages child's efforts	2.00	3.00	2.89	0.33
6. Offers suggestions to help child	1.00	3.00	2.00	0.50
7. Shows enthusiasm about what child is doing	2.00	3.00	2.44	0.53

Table A.28. Teaching domain: Content validity ratings

Descriptive statistics	Minimum	Maximum	Mean	Standard deviation
1. Explains reasons for something to child	1.00	3.00	2.13	0.83
2. Suggests activities to extend what child is doing	1.00	3.00	2.13	0.83
3. Repeats or expands child's words or sounds	2.00	3.00	2.75	0.46
4. Labels objects or actions for child	1.00	3.00	2.38	0.92
5. Engages in pretend play with child	3.00	3.00	3.00	0.00
6. Does activities in a sequence of steps	2.00	3.00	2.38	0.52
7. Talks to child about characteristics of objects	1.00	3.00	1.75	0.71
8. Asks child for information	1.00	3.00	2.25	0.89

Brady-Smith, & Brooks-Gunn, 2002; Fuligni & Brooks-Gunn, 2013) was used by a team of research scholars at Columbia University to code the same semistructured observations used for the development of PICCOLO. The dimensions of positive parenting in the established measure included Sensitivity, Cognitive Stimulation, and Positive Regard. *Sensitivity* was defined as the degree to which the parent was sensitive and child focused, provided praise and encouragement, and established a balance between giving support and allowing independent exploration. *Cognitive Stimulation* was defined as parent efforts to enhance perceptual, cognitive, and language development; to show awareness of the child's developmental level; and to make efforts to bring the child above that level. *Positive Regard* was defined as the parent's expressions of love, respect, and/or admiration for the child, including the quality and quantity of behaviors such as hugging, smiling, praising, and showing clear enjoyment of child. These three ratings were intercorrelated (r = .59–62; Berlin et al., 2002) and combined into one scale of Supportiveness for the national study (*alpha* = .82; Berlin et al., 2002) but were also used separately to examine the construct validity of specific PICCOLO domains. Reliability of the ratings was established at 85% agreement and maintained at 90%, allowing 1-point difference in scores (Administration for Children and Families, 2002).

To examine the construct validity of PICCOLO, ratings of Sensitivity, Cognitive Stimulation, and Positive Regard were examined in relation to the PICCOLO domains of Responsiveness, Teaching, and Affection, respectively. The PICCOLO domain of Encouragement was also examined in relation to these dimensions of positive parenting available from the same observations but did not consistently overlap in definition with one of them. Encouragement and the PICCOLO total score were also examined in relation to the Supportiveness scale. Tables A.29–A.31 show the associations at three age points between PICCOLO and the measure used to code the same observations in the EHS Research and Evaluation Project. Correlations are shown for European Americans, African Americans, and Latino Americans.

Predictive Validity

PICCOLO was designed to assess parenting behaviors that are directly associated with children's positive outcomes, particularly the known indicators of school readiness. In this study, PICCOLO items and domains were significantly correlated with positive child outcomes within each ethnic group and across all three ethnic groups combined.

All four domains were predictive of child development outcomes. When PICCOLO scores were high in any of the domains, children's assessment scores were generally higher on measures of their cognitive and language development and often their social-emotional development as well. Table A.32 shows PICCOLO total and domain scores in relation to specific child outcomes for the combined sample and separate ethnic groups.

To test the overall predictive validity of the PICCOLO scores, summary outcome variables were calculated using z-scores from outcome measures: a cognitive-language outcome variable (Peabody Picture Vocabulary Test–Third Edition [PPVT; Dunn & Dunn, 1997] and Bayley Scales of Infant Development: Mental Development Index [Bayley, 1993] at age 3, *alpha* = .72; PPVT and Woodcock-Johnson Psychoeducational Test Battery–Revised: Letter Word and Applied Problems [Woodcock

Table A.29. Construct validity at 14 months for total sample, European Americans (EA), African Americans (AA), and Latino Americans (LA)

Domains	Sensitivity				Cognitive Stimulation				Positive Regard				Supportiveness			
	Total	EA	AA	LA	Total	EA	AA	LA	Total	EA	AA	LA	Total	EA	AA	LA
Affection	.43	.41	.45	.41	.45	.44	.42	.44	.55	.53	.56	.56	.55	.53	.56	.57
Responsiveness	.39	.41	.44	.31	.29	.27	.30	.24	.32	.31	.36	.25	.39	.39	.44	.31
Encouragement	.43	.44	.47	.33	.41	.41	.43	.32	.44	.42	.48	.38	.50	.49	.55	.41
Teaching	.31	.32	.40	.27	.56	.52	.63	.52	.38	.35	.47	.37	.48	.47	.58	.46
PICCOLO total	.47	.48	.53	.39	.53	.51	.56	.46	.51	.49	.57	.47	.58	.57	.65	.52

Note: Total sample ($N = 1,458–1,575$); European American ($n = 625–660$); African American ($n = 568–623$); Latino American ($n = 266–292$). For all correlations, $p < .001$.

Key: PICCOLO™, Parenting Interactions with Children: Checklist of Observations Linked to Outcomes.

Table A.30. Construct validity at 24 months for total sample, European Americans (EA), African Americans (AA), and Latino Americans (LA)

	Sensitivity				Cognitive Stimulation				Positive Regard				Supportiveness			
Domains	Total	EA	AA	LA	Total	EA	AA	LA	Total	EA	AA	LA	Total	EA	AA	LA
Affection	.50	.42	.59	.39	.50	.40	.49	.32	.54	.46	.60	.52	.57	.50	.41	.50
Responsiveness	.42	.33	.50	.36	.33	.26	.38	.29	.35	.25	.40	.37	.42	.32	.49	.41
Encouragement	.47	.37	.57	.28	.39	.34	.47	.21	.42	.30	.48	.37	.49	.39	.59	.35
Teaching	.40	.34	.52	.35	.56	.50	.66	.55	.36	.30	.41	.35	.51	.44	.41	.52
PICCOLO total	.49	.40	.55	.48	.52	.48	.60	.43	.54	.46	.60	.52	.60	.51	.69	.53

Note: Total sample ($N = 1449$); European American ($n = 614$); African American ($n = 555$); Latino American ($n = 280$). For all correlations, $p < .001$.

Key: PICCOLO™, Parenting Interactions with Children: Checklist of Observations Linked to Outcomes.

Table A.31. Construct validity at 36 months for total sample, European Americans (EA), African Americans (AA), and Latino Americans (LA)

	Sensitivity				Cognitive Stimulation				Positive Regard				Supportiveness			
Domains	Total	EA	AA	LA	Total	EA	AA	LA	Total	EA	AA	LA	Total	EA	AA	LA
Affection	.49	.39	.58	.47	.38	.27	.47	.41	.57	.47	.65	.60	.55	.44	.34	.57
Responsiveness	.40	.27	.50	.41	.26	.13	.35	.33	.34	.23	.41	.39	.38	.24	.48	.44
Encouragement	.43	.37	.49	.35	.30	.25	.36	.29	.41	.34	.45	.41	.44	.38	.50	.41
Teaching	.36	.29	.43	.43	.51	.41	.63	.57	.35	.27	.39	.43	.48	.38	.38	.58
PICCOLO total	.50	.40	.59	.48	.44	.34	.55	.48	.50	.39	.56	.55	.56	.44	.65	.59

Note: Total sample ($N = 1,328–1,332$); European American ($n = 558–560$); African American ($n = 397–398$); Latino American ($n = 265–266$). For all correlations, $p < .001$.

Key: PICCOLO™, Parenting Interactions with Children: Checklist of Observations Linked to Outcomes.

Table A.32. Predictive validity correlations for domains and total scores at each age with later child development outcomes

Domains and ages	Total sample ($N = 880–1,261$)	European American ($n = 385–544$)	Latino American ($n = 102–222$)	African American ($n = 313–495$)
Affection				
14 months	.27**** MDI 24 .24**** MDI 36 .17**** CDI 24[a] .12**** BRS 24 .22**** PPVT 36[a] .26**** PPVT PK[a] .17**** WJLW PK[a] .19**** WJAP PK[a]	.18**** MDI 24 .20**** MDI 36 .18**** PPVT 36 .17**** PPVT PK .18**** WJLW PK .16**** WJAP PK	.26**** MDI 24 .13* CDI 24[a] .15* BRS 24 .15* BRS 36 .24*** PPVT 36[a] .17* PPVT PK .13* WJAP PK[a]	.18**** MDI 24 .19**** MDI 36 .12** BRS 24 .21**** PPVT 36 .23**** PPVT PK .20**** WJAP PK
24 months	.28**** MDI 36 .25**** PPVT 36[a] .30**** PPVT PK[a] .18**** WJLW PK[a] .21**** WJAP PK[a]	.23**** MDI 36 –.16**** CBC PK .16**** PPVT 36 .16**** PPVT PK	.21*** PPVT 36[a] .26*** PPVT PK .13* WJAP PK[a]	.17**** MDI 36 .14*** PPVT 36 .22**** PPVT PK .23**** WJLW PK .21**** WJAP PK
36 months	.27**** PPVT PK[a] .22**** WJLW PK[a] .16**** WJAP PK[a]	.16**** PPVT PK .21**** WJLW PK	.38**** PPVT PK	.20**** PPVT PK .21**** WJLW PK .16*** WJAP PK
Responsiveness				
14 months	.19**** MDI 24 .18**** MDI 36 .16**** CDI 24[a] .16**** PPVT 36[a] .21**** PPVT PK[a] .15**** WJLW PK[a] .16**** WJAP PK[a]	.22**** MDI 24 .25**** MDI 36 .14**** CDI 24 .15*** PPVT 36 .19**** PPVT PK .18**** WJLW PK .15**** WJAP PK	.20*** MDI 24 .20*** CDI 24[a] .14** WJLW PK[a]	.15*** MDI 24 .17**** CDI 24 .14*** BRS 24 .20**** PPVT 36 .20**** PPVT PK .13* WJLW PK .19**** WJAP PK
24 months	.23**** MDI 36 .22**** PPVT 36[a] .24**** PPVT PK[a] .15**** WJLW PK[a] .19**** WJAP PK[a]	.27**** MDI 36 .19**** PPVT 36 .21**** PPVT PK .18**** WJLW PK .14*** WJAP PK	.17* MDI 36 .18** PPVT 36[a] .19* PPVT PK .13* WJLW PK[a] .14* WJAP PK[a]	.18**** MDI 36 –.16**** CBC 36 .27**** PPVT 36 .25**** PPVT PK .26**** WJLW PK .23**** WJAP PK
36 months	.22**** PPVT PK[a] .16**** WJLW PK[a] .13**** WJAP PK[a]	–.15**** CBC PK .20**** PPVT PK .18**** WJLW PK .13*** WJAP PK	.24* PPVT PK	.25**** PPVT PK .17*** WJLW PK .18**** WJAP PK
Encouragement				
14 months	.24**** MDI 24 .23**** MDI 36 .13**** CDI 24[a] .19**** PPVT 36[a] .23**** PPVT PK[a] .15**** WJLW PK[a] .16**** WJAP PK[a]	.21**** MDI 24 .26**** MDI 36 .12*** CDI 24 .20**** PPVT 36 .21**** PPVT PK .19**** WJLW PK .14*** WJAP PK	.24**** MDI 24 .12* CDI 24[a] .19** BRS 24 .19** BRS 36 .15* PPVT 36[a]	.25**** MDI 24 .23**** MDI 36 .15**** CDI 24 .15*** BRS 24 .28**** PPVT 36 .25**** PPVT PK .13* WJLW PK .22**** WJAP PK
24 months	.24**** MDI 36 .24**** PPVT 36[a] .28**** PPVT PK[a] .14**** WJLW PK[a] .20**** WJAP PK[a]	.24**** MDI 36 –.13*** CBC PK .25**** PPVT 36 .21**** PPVT PK .13*** WJAP PK	.22**** BRS 36 .19** PPVT 36[a]	.19**** MDI 36 –.13*** CBC 36 .27**** PPVT 36 .23**** PPVT PK .26**** $N = 322$ WJLW PK .25**** $N = 424$ WJAP PK
36 months	.24**** PPVT PK[a] .21**** WJLW PK[a] .17**** WJAP PK[a]	.17**** PPVT PK .24**** WJLW PK .15**** WJAP PK	–.16* CBC PK	.21**** PPVT PK .24**** WJLW PK .19**** WJAP PK

(continued)

Table A.32. *(continued)*

Domains and ages	Total sample (*N* = 880–1,261)	European American (*n* = 385–544)	Latino American (*n* = 102–222)	African American (*n* = 313–495)
Teaching				
14 months	.22**** MDI 24 .18**** MDI 36 .13 **** CDI 24[a] .20**** PPVT 36[a] .20**** PPVT PK[a] .15**** WJLW PK[a] .13**** WJAP PK[a]	.21**** MDI 24 .22**** MDI 36 .13*** CDI 24 .26**** PPVT 36 .17**** PPVT PK .12* WJLW PK	.23**** MDI 24 .18** BRS 24 .28**** BRS 36 .18** PPVT 36[a] .18* PPVT PK .14* WJAP PK[a]	.27**** MDI 24 .25**** MDI 36 .17**** CDI 24 .16**** BRS 24 .22**** PPVT 36 .29**** PPVT PK .21**** WJLW PK .18**** WJAP PK
24 months	.24**** MDI 36 .20**** PPVT 36[a] .24**** PPVT PK[a] .18**** WJLW PK[a] .16**** WJAP PK[a]	.27**** MDI 36 –.18**** CBC PK .19**** PPVT 36 .20**** PPVT PK .16*** WJLW PK .12** WJAP PK	.18** MDI 36 .16* BRS 36 .24**** PPVT 36[a] .33**** PPVT PK .14* WJLW PK[a] .15** WJAP PK[a]	.25**** MDI 36 –.12** CBC 36 .26**** PPVT 36 .23**** PPVT PK .22**** WJLW PK .22**** WJAP PK
36 months	.24**** PPVT PK[a] .22**** WJLW PK[a] .15**** WJAP PK[a]	.22**** PPVT PK .21**** WJLW PK .17**** WJAP PK	.30*** PPVT PK .17** WJLW PK[a]	.31**** PPVT PK .27**** WJLW PK .21**** WJAP PK
PICCOLO total				
14 months	.23**** MDI 24 .19**** MDI 36 .13 **** CDI 24[a] .24**** PPVT 36[a] .21**** PPVT PK[a] .15**** WJLW PK[a] .14**** WJAP PK[a]	.21**** MDI 24 .22**** MDI 36 .13*** CDI 24 .26**** PPVT 36 .17**** PPVT PK .12* WJLW PK	.23**** MDI 24 .18** BRS 24 .28**** BRS 36 .18** PPVT 36[a] .18* PPVT PK .14* WJAP PK[a]	.27**** MDI 24 .25**** MDI 36 .17**** CDI 24 .16**** BRS 24 .22**** PPVT 36 .29**** PPVT PK .21**** WJLW PK .18**** WJAP PK
24 months	.25**** MDI 36 .24**** PPVT 36[a] .23**** PPVT PK[a] .19**** WJLW PK[a] .16**** WJAP PK[a]	.27**** MDI 36 –.18**** CBC PK .19**** PPVT 36 .20**** PPVT PK .16*** WJLW PK .12** WJAP PK	.18** MDI 36 .16* BRS 36 .24**** PPVT 36[a] .33**** PPVT PK .14* WJLW PK[a] .15** WJAP PK[a]	.25**** MDI 36 –.12** CBC 36 .26**** PPVT 36 .23**** PPVT PK .22**** WJLW PK .22**** WJAP PK
36 months	.25**** PPVT PK[a] .24**** WJLW PK[a] .16**** WJAP PK[a]	.22**** PPVT PK .21**** WJLW PK .17**** WJAP PK	.30*** PPVT PK .17** WJLW PK[a]	.31**** PPVT PK .27**** WJLW PK .21**** WJAP PK

Note: Correlations are included in the table if $p < .05$ and $r > .11$.

Key: BRS, Bayley Scales of Infant Development: Behavior Rating Scales: Emotion Regulation (24 months, 36 months; Bayley, 1993); CBC, Child Behavior Checklist Aggression score (24 months, 36 months; Achenbach & Rescorla, 2000); CDI, Communication Development Index: Vocabulary Production (24 months; Fenson et al., 1994); MDI, Bayley Scales of Infant Development: Mental Development Index: Cognitive Development (24 months, 36 months; Bayley, 1993); PPVT, Peabody Picture Vocabulary Test–Third Edition: Receptive Vocabulary (36 months, prekindergarten; Dunn & Dunn, 1997); WJAP, Woodcock-Johnson Psychoeducational Test Battery–Revised: Applied Problems: Problem Solving (prekindergarten; Woodcock & Johnson, 1989); WJLW, Woodcock-Johnson Psychoeducational Test Battery–Revised: Letter Word: Emergent Literacy (prekindergarten; Woodcock & Johnson, 1989); 24, 24 months; 36, 36 months; PK, prekindergarten.

* $p < .05$; ** $p < .01$; *** $p < .001$; **** $p < .0001$.

[a]Partial correlation controlling for test language (English or Spanish).

& Johnson, 1989] at prekindergarten, *alpha* = .74) and a cognitive-language-social outcome variable (adding Bayley Scales of Infant Development: Behavior Rating Scales [Bayley, 1993] and reverse-scored Child Behavior Checklist [CBC; Achenbach & Rescorla, 2000] Aggression at age 3, *alpha* = .64; and CBC Aggression at prekindergarten, *alpha* = .65).

Table A.33. Overall predictive validity of total Parenting Interactions with Children: Checklist of Observations Linked to Outcomes (PICCOLO™) scores

	Cognitive-language outcomes		Cognitive-language-social outcomes	
	3 years	Prekindergarten	3 years	Prekindergarten
PICCOLO 1 year	.25**	.25**	.20**	.23**
PICCOLO 2 years	.27**	.27**	.24**	.24**
PICCOLO 3 years	.21**	.24**	.19**	.25**
PICCOLO 1–3 years	.27**	.28**	.21**	.26**

**$p < .01$; partial correlations, controlling for testing language (Spanish or English).

Statistically significant correlations between these constructed outcome variables and PICCOLO at each age, as well as PICCOLO averaged for the three ages, demonstrated that the PICCOLO measure predicts children's developmental outcomes (see Table A.33).

The psychometric properties of the PICCOLO measure have been tested and show considerable evidence of multiple aspects of reliability and validity. The items that make up PICCOLO can be reliably observed by non-experts with only a few hours of training. The four domains of PICCOLO—Affection, Responsiveness, Encouragement, and Teaching, represent reliable scales. The items show content validity, and the domains and total PICCOLO scores show construct validity. Finally, the domains and the total PICCOLO scores predict positive outcomes for children, particularly the cognitive, language, and social skills that underlie school readiness.