CHELLO: The Child/Home Environmental Language and Literacy Observation

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Abstract

The purpose of this study was to develop a valid and reliable tool for measuring the quality of the language and literacy environment in home-based settings. Based on a convergence of research on the ecological and psychological factors associated with early literacy development, the Child/Home Environmental Language and Literacy Observation (CHELLO) was developed to gauge the quality of current practices associated with positive early childhood literacy outcomes. Following the structure of the Early Language and Literacy Classroom Observation Scale (ELLCO) [Smith, M., & Dickinson, D. (2002). *Early language & literacy classroom observation*. Baltimore, MD: Brookes], we developed two interdependent tools: The Literacy Environment Checklist and the Group/Family Observation and Provider Interview. Inter-rater reliability using weighted kappas indicated acceptable reliability. Following this analysis, the CHELLO was administered in 128 home-based settings in four low-income urban areas. Initial evidence of its psychometric properties provided support for internal consistency. Although more research is needed, the CHELLO has the potential to serve as a useful tool for examining the language and literacy environment in home-based settings.
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1. Introduction

There is now strong and compelling evidence that links the quality of developmentally appropriate language and literacy experiences with school readiness skills (Dickinson & Neuman, 2006; Neuman & Dickinson, 2001). Children who arrive in kindergarten with a foundation of pre-literacy skills, and the interest and motivation to learn, are better prepared for the complex task of learning to read than those who lack these foundational skills (Wasik, Bond, & Hindman, 2006). This research underscores the significance of ensuring that all children- especially low-income children- are provided with quality early childhood experiences shown to be highly associated with language and literacy outcomes.

Yet these experiences continue to elude many children, particularly those who might benefit the most in the early years. For example, studies have reported a paucity of books available in early childhood settings (Neuman, Celano, Greco, & Shue, 2001), limited experiences with daily storybook reading (Dickinson & Tabors, 2001), few opportunities devoted to informational texts and other genres (Duke, 2000), and limited to no choice time in literacy-related play (Christie, 1991). Moreover, research has documented that many early care and education settings may not offer the

amount and quality of linguistic input needed to enhance children's vocabulary and language repertoire known to serve as an important foundation for literacy learning (Bruner, 1980; Hart & Risley, 1995).

Research in home-based care settings, in particular, reveals a disturbing profile of limited language and early literacy opportunities. For example, a number of multi-city studies (Galinsky, Howes, Kontos, & Shinn, 1994; Helburn, 1995; Kontos, 1992) have reported the paucity of learning and play materials in home-based settings. For economically disadvantaged children (Lee & Burkam, 2002), these kinds of meaningful language and literacy experiences in the early years may be especially important for developing conceptual knowledge, comprehension, and reading proficiency later on. According to Fuller, Kagan, Caspary, and Gauthier (2002), children from low-income families in home care arrangements displayed significantly lower rates of cognitive and language growth than others who attended center-based care.

Recognizing the critical importance of literacy learning for children's future and the gap that already exists prior to school entry (Hart & Risley, 1995), it is clear that we must reach our youngest children early on to help them develop language, print, and motivational dispositions for reading and writing success. To date, however, we have lacked highly reliable and valid instruments to assess the quality of language and literacy experiences in home-based settings.

In this paper, we describe the development and validity of a new procedure for assessing the language and literacy environment in home-based child care settings: the Child/Home Environmental Language and Literacy Observation, or CHELLO. Designed to measure the print and language richness in family and group child care settings for children ages birth through five, the measure is specifically targeted to environmental features associated with positive early literacy outcomes.

CHELLO is unique among extant techniques in its focus on language and literacy experiences in family and group child care homes. Other tools used in home-based settings measure the overall quality of the setting, focusing on the physical environment, structural characteristics, and process characteristics like caregiver–child interactions. For example, the widely used Family Day Care Rating Scale (FDCRS) (Harms, Cryer, & Clifford, 2007) comprehensively defines quality of family day care. The 32 items of the scale cover six categories: Space and Furnishings for Care and Learning, Basic Care, Language and Reasoning, Learning Activities, Social Development, and Adult Needs. However, it does not measure the existence of print materials or instructional activities related to literacy development (like interactive storybook reading).

The CC-Home (Bradley, Caldwell, & Corwyn, 2003), based on the Home Observation for Measurement of the Environment (HOME) inventory (Caldwell & Bradley, 2003), is another comprehensive measure of the quality of care individual children receive in family child care arrangements. Designed for use in settings serving children between 3 and 6 years of age, the Early Childhood CC-Home contains 58 items clustered into eight subscales: Learning Materials, Language Stimulation, Physical Environment, Caregiver Responsivity, Academic Stimulation, Modeling of Social Maturity, Variety in Experience, and Acceptance of Child. Although it examines the presence of toys, books, and language stimulation, the inventory is not intended to measure the activities and interactions targeted to children's literacy engagement.

Another widely used observation measure is the Early Language and Literacy Classroom Observation (ELLCO) (Smith & Dickinson, 2002), which was designed to examine the quality of language and literacy experiences in preschool classrooms. Although the ELLCO is required in Early Reading First grants, many of its observational ratings are not appropriate to the context of home-based child care. Further, only one rating scale attempts to capture the dynamics of language interactions, informal conversations, or learning through play.

Consequently while each of the measures described here has been designed to effectively examine some specific aspects of the language and literacy environment in child care settings, they vary in purpose (global quality versus targeted language and literacy practices), target audience (home-based caregivers; center-based caregivers), and focus (structural versus process characteristics). To date, we have lacked measures to examine the language and literacy environment in home-based child care settings (also known as family, friend, and neighbor care). The CHELLO is designed to fill this gap.

2. Theoretical framework of the CHELLO

The CHELLO includes two interdependent tools: (a) the Literacy Environment Checklist which measures the quality of resources and organization of space in home-based care settings, and (b) the Group/Family Observation and Provider Interview which measures the quality of instructional supports and the affective environment for literacy learning.

Together, these measures examine environmental factors that have been strongly linked to literacy development, providing information that may be used for examining current practice, and for tracking progress over time.

2.1. Physical design features that support literacy practices

The CHELLO is based on the theoretical assumptions of ecological psychology (Day, 1983; Gump, 1989) that describes how environment plays a central role in learning and behavior. From this perspective, the organization, structure, and complexity of a child care setting influence patterns of activity and engagement. A fairly sizable number of studies (Morrow, 1990; Neuman & Roskos, 1992, 1997; Vukelich, 1994) have substantiated this perspective by illustrating the powerful impact of access to literacy tools on young children's involvement in literacy activities. This research indicates that in settings carefully constructed to include a wide access of literacy tools, books, and play materials, children read more (Neuman & Roskos, 1992), and engage more in literacy-related play themes (Morrow, 1990). In these studies, increased access to literacy tools has led to increased use, which has ultimately resulted in improvements in literacy development (Neuman & Roskos, 1990).

In addition to the influence of access to literacy-related tools, there is ample evidence that the use of space in settings influences learning (Neuman, Roskos, Wright, & Lenhart, 2007; Roskos & Neuman, 2001). Children use space and its boundaries to regulate and guide their own responses. For example, studies find that smaller, well-defined niches and nooks seem to encourage greater language and collaboration with peers and adults (Morrow, 1988; Neuman & Roskos, 1997). Children are likely to use these more intimate settings to interact in longer and richer conversation with others.

In related studies, Fernie (1985) and Neuman and Roskos (1990) show evidence that materials can influence children's engagement and behavior. Some materials seem to encourage more sustained activity than others, and invoke children's attention at different ages (Rosenthal, 1973). Materials that involve children in constructive activity, for example, tend to generate more language than "pull toys." Some materials elicit greater social interaction and cooperation (e.g. block building), whereas others encourage more solitary or parallel play (e.g. puzzles) (see review, Roskos & Neuman, 2001).

Children's engagement in play is also influenced by the placement and grouping of objects (Neuman & Roskos, 1993). Children become more involved in sustained play when objects are clustered together to create a schema or meaning network. For example, in one study (Neuman & Roskos, 1993), placing props associated with mailing letters together in a play setting (for example, envelopes, writing instruments, stamps and stationary) led to longer play episodes than when these props were scattered throughout the room. Further, props that were authentic, familiar, and useful to common literacy contexts (like telephones in the kitchen area or mailboxes in the office area) encouraged more complex language interactions and routines.

The proximity of quality books at children's eye view supports involvement in literacy-like enactments (Morrow & Weinstein, 1986; Neuman, 1999). In one of the first intervention studies of its type, Morrow and Weinstein (1986) examined the impact of creating library corners in early childhood settings. These library corners were specially constructed to include the following elements: (a) a clear location with well-defined borders, (b) comfortable seating and cozy spots for privacy, (c) accessible, organized materials, and (d) related activities that extended whole- and small-group book activities. Morrow and Weinstein found that the frequency of use rose significantly when library corners were made more visibly accessible and attractive. Similarly in a large-scale study in 500 child care settings (Neuman, 1999), library settings were created to "put books in children's hands." Observations indicated that children spent significantly more time interacting with books when they were placed in close proximity to children's play activities.

In sum, there is clear and abundant evidence that certain design features in environments support young children's literacy engagement and subsequent achievement. Physical design features such as access to literacy tools and resources and arrangement of space and materials may help to focus and sustain children's activity, thus providing greater opportunity to engage in language and literacy behaviors. Taken together, this research indicates that a more deliberate approach to the selection and arrangement of materials, according to specific design criteria, may enhance children's uses of literacy objects and related print resources.

2.2. Interactional supports for literacy learning

Environments include not only physical settings but psychological settings for literacy learning as well (Tharp & Gallimore, 1988). Children are influenced by the participants present in a setting, their background experiences, and

their values, and it is the integration of place, people, and occasion that support opportunities for learning. These individuals act as social and psychological resources that provide information and feedback through demonstrations and interactions. From a Vygotskian perspective (Vygotsky, 1978), the participants in the setting have the potential to help children perform at a higher level than they would be able to by interacting with their physical environment alone. It is the contrast between assisted and unassisted performance that differentiates learning from development.

A great corpus of research (Dickinson & Neuman, 2006; Neuman & Dickinson, 2001) identifies the types of supports that promote children's language and literacy development. Essentially, they highlight both instructional and relational components. Since language represents the foundational basis for literacy learning in the early years, the amount of verbal input in settings enhances children's language development (Hart & Risley, 1995; Hoff-Ginsberg, 1991). Children whose teachers engage them in rich dialogues have higher scores on tests of both verbal and general ability (Whitehurst et al., 1988). This is especially the case when discussions consist of teachers encouraging, questioning, predicting, and guiding children's exploration and problem-solving (Palinscar, Brown, & Campione, 1993). Such verbal interactions contribute to children's vocabulary growth which, in turn, is strongly correlated with phonological awareness, comprehension, and subsequent reading achievement (Snow, Burns, & Griffin, 1998).

Teachers also engage in activities that are highly supportive of literacy development. Reading stories to children on a regular basis is regarded as one of the more potent supports for literacy learning (Snow et al., 1998). Studies (Dickinson & Smith, 1994) have shown that a teacher's style or approach to reading storybooks to children impacts their language and literacy development. Shared book reading activities such as dialogic reading (Whitehurst et al., 1988) and repeated readings (Morrow, 1988) have been widely studied and identified as an important source of knowledge about vocabulary, about letters, and about the characteristics of written language.

Teachers' attention to and support of emergent writing (Neuman et al., 2007), as well, has also been shown to strongly connect with children's developing phonological awareness, phonemic awareness, and readiness skills. Activities that involve drawing and writing and teacher scaffolding help to build the alphabetic principle (Adams, 1990), i.e. the insight that letters and sounds are integrally connected. Further, teachers' interactions in literacy-related play have been shown to relate to children's length of utterances and sustainability in play themes (Neuman & Roskos, 1992). Taken together, activities that engage children in reading, writing, talking, and playing create occasions for meaningful communicative interactions involving language and print.

This research highlights the central role of the caregiver who evokes children's interest and engagement in literacy learning. According to Bus, Van Ijzendoorn, and Pellegrini (1995), children build a mental representation of their interactions with caregivers that influence their expectations and responses to activities. When children feel secure, they engage in learning; when insecure in situations, they may use digressive tactics to avoid activity. For example, in a cross-sectional study of interactive reading with 18-, 32-, and 66-month children, Bus and Van Ijzendoorn (1995) found that the atmosphere surrounding book reading was more positive among securely attached caregiver–child dyads than anxiously attached dyads. For securely attached children, book reading was ultimately an enjoyable task, tied to learning improvement; for insecure children, it was negative, with caregivers often using verbal and nonverbal cues to discipline behavior.

Other studies (Hamre & Pianta, 2005; Miles & Stipek, 2006; Pianta, La Paro, Payne, Cox, & Bradley, 2002) support the linkage between children emotional security and cognitive activity, as well. In child care settings rich with creative play activities and staffed by teachers who provide children with emotional security, Howes and Smith (1995) report that children not only thrive socially but cognitively as well. Similarly Peisner-Feinberg and her colleagues (Peisner-Feinberg et al., 2001) found that the influence of close attachment between caregivers and children yielded even stronger positive effects for children from disadvantaged backgrounds. Recent studies (Hamre & Pianta, 2005) have shown that these emotional supports may have important moderating effects during the elementary school years as well.

From an ecological perspective, therefore, the physical and psychological environment plays a vital role in children's learning about literacy. These supports mediate opportunities for literacy engagement and practice and will likely influence children's attitudes and efforts to engage in literacy activities despite difficulties they may encounter as they get older in learning to read.

Building on the work of extant measures and the research evidence on language and literacy development, the CHELLO was designed to measure the quality of the language and literacy environmental supports in home-based care settings strongly associated with positive literacy outcomes. Therefore, the purpose of this study was to (a) describe the development and validation of the CHELLO and (b) examine its psychometric properties. Given such evidence, the CHELLO could become a highly useful tool to better understand the quality of language and literacy environments in home-based care settings.

3. Method

3.1. Study 1: Initial phase of development

3.1.1. Sample

Ten home-based providers were selected to participate in the first phase of instrument development. Referred by the local resource and referral agency, each was considered to be an exemplary home-based provider. Recognizing that the provision of high-quality family/group child care is a skilled occupation requiring specific skills, intentions, and knowledge (Doherty, Forer, Lero, Goelman, & LaGrange, 2006; Kontos, 1992), our purpose was to observe how providers might optimize their environment to support early language and literacy experiences.

3.1.2. Procedures

From the review of the literature as well as extant measures (e.g. the observational categories from the ELLCO), we outlined a set of physical environmental characteristics and caregiver behaviors associated with positive literacy outcomes. On the basis of this initial protocol, 2-h observations were scheduled with each provider. These observations were designed to gather in-depth, contextually specific examples and descriptors of how home-based caregivers used the environment, how they might provide teaching supports, and how they planned activities based on multiple-aged children's interests. Simultaneously, our observations were also designed to capture additional dimensions of literacy-related activity or behaviors that might not have been considered when establishing these pre-selected characteristics.

Non-participant observations were used to guide the collection of data. With caregiver permission, we took pictures, made drawings of environmental features, and recorded interactions that related to literacy engagement. Following our observations, we conducted informal conversations to elicit further information on any additional dimensions of the environment that needed to be considered.

3.1.3. Item development

Based on a structure developed by the ELLCO (Smith & Dickinson, 2002), items were constructed to examine the physical environment, supports for learning, and teaching strategies. We developed two interdependent tools: The Literacy Environment Checklist, and the Group/Family and Provider Interview.

3.1.3.1. The Literacy Environment Checklist. Focused exclusively on the physical environment, the checklist was designed to examine the availability, and condition of materials for children's language and literacy uses. It measures five components of the environment: the Book Area (four items), Book Use (six items), Writing Materials (six items), Educational Toys (three items), and Technology (three items). Designed to take less than 10 min, the checklist records the presence or absence of 22 items in the environment.

Observers score items on a dichotomous (yes = 1; no = 0) scale (with the exception of three 3-point scaled items). Items are added up to derive a total score ranging from 0 to 26.

3.1.3.2. Group/Family Observation subscales. The Group/Family Observation section of the CHELLO is organized across a set of 13 observational components in three subscales. Observational components of the CHELLO examine: (a) Physical Environment for Learning (three ratings), (b) Support for Learning (three ratings), and (c) Teaching Strategies (seven ratings). Within each observational rating, there are three to four items that are scored to provide more detailed descriptions of each of the components (see Appendix A for example).

The Physical Environment for Learning subscale captures the extent to which the environment supports children's learning. It examines the organization of the environment, accessibility of materials, and daily routines that provide both structure and choice. These design features, in addition to the use of time, space, and resources, are known to relate to children's engagement in language and literacy behaviors.

The Support for Learning subscale examines the relationship between the provider and the child and the quality of interactions between the two. Observational ratings include adult affect, adult–child interactions, and adult control behaviors, all of which recognize the important linkages between children emotional security and cognitive activity (Pianta et al., 2002). Close emotional attachments between caregivers and children have been shown to strongly influence social, cognitive development, and language and literacy learning (Bus et al., 1995).

The Teaching Strategies subscale measures the extent to which providers make use of effective instructional and support strategies to enhance children's language and literacy development. It examines seven features of teaching: Vocabulary Building, Responsive Strategies, Use of Print, Storybook/Storytelling Activities, Writing Activities, Progress Monitoring, and Family Support and Interaction. As noted in the research literature above, verbal interactions, interactive book reading activities, opportunities to engage in developmental writing, and parental involvement mediate opportunities for literacy engagement and are known to influence literacy outcomes.

These observational ratings are examined using a 1 (deficient) to 5 (exemplary) scale. Rubrics were first developed for exemplary categories (indicated by a score of 5) using examples from the literature and exemplary practices among family caregivers, followed by Basic (3) ratings indicating some evidence, and Deficient (1) ratings, representing minimal to no evidence of the practice.

Augmenting the Group/Family Observation section is a Provider Interview (see Appendix A). Six questions seek to elicit information related to the Observation scale that may not have been evident throughout the observation. Consequently, almost every provider question is cross-referenced to specific items on the scale. For example, "How do you communicate with the children's families?" is designed to provide information for items on Family Support and Interaction. The interview might reveal that the provider sends home a weekly newsletter with strategies for promoting children's language and literacy activities, or schedules home visits with families. After recording the responses to the interview, observers are asked to fill in gaps on the observation scales.

3.1.4. Scoring of Observation subscales

Each item is rated on a 1–5 scale with rubric descriptions anchored at odd numbers (1, 3, and 5). An average score is derived by adding the item scores and dividing that by the number of items for each of the 13 observational ratings. Scores are calculated for each section: The Physical Environment, Support for Learning, and Adult Teaching Strategies. An overall CHELLO score is derived by adding the Literacy Environment Checklist score and the Group/Family Observation Score together, for a total possible score of 91.

3.1.5. Piloting and revision

We asked the home-based providers to review the instrument for accuracy, clarity, and inclusiveness, and to provide detailed written comments. Simultaneously, we also requested feedback from specialists at four local resource and referral agencies. After revising, we then each piloted the instrument in three family day care settings in three cities to determine the approximate length of the observation.

3.1.6. Results

Collectively, we reviewed the observational reports, feedback, and provider comments from these pilot sites, and made minor refinements. Pilot testing revealed that the Literacy Environment Checklist took approximately 10–12 min, the Group/Family Observation and the Provider Interview, approximately 1–1.5 h, for a total administration time of approximately 2 h.

3.2. Study 2: Field-testing of CHELLO

The purpose of this study was to field-test the CHELLO in home-based settings to examine the reliability and validity of this observational tool.

3.2.1. Sample

The sample included 128 home-based care settings in four urban communities: Detroit, Flint, Grand Rapids, and Lansing. These family-group child care settings were recruited by the local resource and referral agency as part of a larger study on professional development directed by the first author. The sample represented settings in high priority areas of concentrated poverty and in catchment areas of low school achievement.

Child care providers were all female. Over half of the providers (58 percent) were Caucasian, 37% African-American, 4% Hispanic, and 1% Asian. Nearly half (46%) had a high school degree or less, 31% had taken some early childhood classes, 17% had earned a Child Development Associates degree, 6% had taken non-credit coursework, and 7% had a bachelor's degree in an area outside of education. None of the caregivers had a state-earned specialization in early

childhood. Providers' average age was 39. Approximately half of the sample had worked in child care 11 years or more and the other half between 5 and 10 years.

3.2.2. Procedures

Using trained observers, a sample of home-based settings was observed in early Fall 2005 to establish the inter-rater reliability the CHELLO. Training for the observers involved a full-day seminar. To become certified, observers had to give the same score for at least 80 percent of items from videotapes of segments from home-based settings; the remaining items had to be coded within one score of the lead trainer.

Following the analysis of inter-rater reliability, 20 observers were trained and certified. These observers were dispatched to observe the entire sample of 128 home-care providers. For their first three observations, a novice observer was paired with a previously certified observer. Well after data collection had begun, observers coded several care settings in pairs and their agreement was checked to ensure that there was no slippage in reliability. Data collection was completed across the four cities over a 6-week period in late Fall.

3.2.3. Results

In these analyses, we report on the inter-rater reliability, and internal consistency of the CHELLO, as well as the correlations among the interdependent tools.

3.2.3.1. Inter-rater reliability.
To establish inter-rater reliability, observers independently rated 30 home-based settings in pairs. Cohen's kappa statistic (Cohen, 1960, 1968) was used to calculate reliability. This approach for calculating reliability is recommended to estimate the degree of consensus between two judges after correcting for the amount of agreement that could be expected by chance alone. In other words, the kappa is the proportion of agreement after chance agreement has been excluded. The kappa is considered a more conservative estimate of inter-rater reliability, and hence, tends to under-estimate item agreement (DiEugenio & Glass, 2004).

However, kappa does not take into account the degree of disagreement between observers. Rather, all disagreement is treated equally as total disagreement. Therefore, it is preferable to use weighted kappa to allow for degrees of agreement rather than a simple agree/disagree classification (Sims & Wright, 2005). This indicator assigns different weights to subjects so that different levels of agreement can contribute to the value of kappa.

Because the scores of the two sections in CHELLO were not on the same measurement scale, weighted kappas were calculated separately for the Literacy Environment Checklist and the Group/Family Observation. For the Literacy Environment Checklist, the weighted kappa was highly substantial at .84; for the Group/Family Observation, the weighted kappa was moderately high at .54.

Landis and Koch (1977) suggest that kappa values from .41 to .60 are moderate, and that values above .60 are substantial. Consequently, given that the kappa statistic for the Literacy Environment Checklist was well above the .60 level, and the Group/Family Observation approached the substantial figure, the results indicate an acceptable level of inter-rater reliability.

3.2.3.2. Internal consistency.
Using the full administration of the CHELLO for all 128 home-based settings, we then examined the internal consistency of the instrument. Internal consistency measures the degree to which the tool and the subscales within them appear to measure a common construct.

We recognize, however, that while coefficient alpha is used considerably in the field to measure internal consistency, it is not ideal for environmental measures. Ideally, alpha is designed for instruments that contain effect not cause indicators. As Bollen (2002) cautions, indicators may be grouped together for many reasons (e.g. number of books; condition of books), some of which may have little to do with presumed outcomes.

However, coefficient alpha can provide useful information on whether indicators are connected to one another and in this respect, help to support the selection of indicators based on theoretical principles and previous research. With these considerations, therefore, we examined these measures using Cronbach's alpha, analyzing each tool separately.

Table 1 reports descriptive statistics for the Literacy Checklist for the sample of home-based providers. Subscales, by and large, were within average ranges with the exception of toys. In this instance, there was clearly a ceiling effect. All care settings had at least some cognitively stimulating toys.

Table 1
Descriptive statistics for Literacy Environment Checklist

Variable	*M*	S.D.	Minimum	Maximum
Book Area	2.45	1.58	0	5
Book Use	5.83	1.93	0	9
Writing Area	2.27	1.40	0	5
Toys	2.79	.48	1	3
Technology	1.60	.92	0	3
Total	14.92	4.34	3	24

To examine the internal consistency of the Checklist, we created three summary variables: (a) Books subtotal, including items from the Book Area and Book Use sections, (b) Writing subtotal, including items from Writing Materials and Writing around the Room, and (c) Total score. Toy and Technology sections were excluded in this analysis since both sections were each made up of only three items. Cronbach's alpha formula takes into account both the number of items within a scale/section as well as the correlations between these items in order to calculate uni-dimensionality. The fewer number of items, the less reliable a scale will be even if there is a high estimated correlation between the individual items. However, these items were included in the Total score.

Table 2 shows the alphas for the subtotals as well as the total score. Cronbach's alpha for the total score demonstrated good internal consistency ($\alpha = .78$). All item-total correlations were moderate to high ($r = .28$ to $r = .43$) (item total correlations are not included here due to space considerations).

Cronbach's alpha of .76 showed good internal consistency for the Books subtotal. Item-total correlations ranged from moderate ($r = .31$) for Item 5 in the Book Use section ("Are books located throughout the setting?") to high ($r = .78$) for Item 1 in the Book Area section ("Is an area set aside just for book reading?").

Cronbach's alpha for the Writing subtotal was .67, which was somewhat low but still within an acceptable range of internal consistency. Item-total correlations were moderate ($r = .39$) ("Is there an alphabet in children's eye view?") to high ($r = .78$) ("Is there a place set aside for writing?").

Overall, the Literacy Environment Checklist reflected good internal consistency ($r = .78$), indicating that items appeared to measure a common set of characteristics in the physical environment.

Table 3 reports descriptive statistics for the Group/Family Observation. Most of the scores were in the average range with the exception of the Uses of Print and Progress Monitoring strategies. In both cases, scores approached a floor effect. In these home settings, providers showed limited use of print to label parts of the environment, or print for functional purposes, including literacy-related props, books, or signs. Similarly, there was minimal evidence of documentation for monitoring children's progress and development through observations, narratives, or portfolios.

Based on the theoretical assumptions and related research on which the instrument was constructed, we created three summary variables for the Group/Family Observation: Physical Environment for Learning, Support for Learning, and Adult Teaching Strategies.

Table 4 reports the internal consistency obtained for the Group/Family Observation. Cronbach's alpha of .91 for the Physical Environment for Learning showed good internal consistency for this composite. All item-total correlations were high, with correlation coefficients ranging from .57 (indicating the degree to which children had sufficient time for self-directed activities and independent explorations) to .86 (whether the environment was intentionally organized with cognitively stimulating interest areas that support language and literacy development).

Table 2
Cronbach's alpha for the Literacy Environment Checklist ($N = 128$)

Composite variable	No. of items	α
Books subtotal	10	.782
Writing subtotal	6	.687
Total Score	22	.824

Table 3
Descriptive statistics for the Group/Family Observation

Variable	M	S.D.	Minimum	Maximum
Physical Environment for Learning				
Organization of the environment	2.81	.99	1	5
Materials in the environment	2.93	1.00	1	5
Daily schedule	2.91	.89	1	5
Support for Learning				
Adult affect	3.53	.86	1.67	5
Adult–child interaction	3.36	.92	1.50	5
Adult control behaviors	3.16	.94	1	5
Teaching Strategies				
Vocabulary Building	2.63	1.09	1	5
Responsive Strategies	3.25	.89	1	5
Use of Print	1.66	.89	1	5
Storytelling/Storybook Reading	2.67	.94	1	5
Writing Activities	2.34	1.04	1	5
Progress Monitoring	1.88	.93	1	5
Family Support and Interaction	3.26	1.09	1	5
Total	48.93	12.19	24.92	81.83

Similarly, the internal consistency was high for the other two composites, Supports for Learning and Adult Teaching Strategies, with .92 and .93, respectively. All item-total correlations for Supports for Learning were substantial, ranging from .66 (evidence for bringing the home culture and language into the setting) to a high of .85 (the degree to which providers regularly give children opportunities to initiate and actively influence verbal exchanges).

Item-total correlations for Adult Teaching Strategies were moderate to high ($r = .41$ to $r = .80$). Moderate correlations were reported for providers acknowledging children's accomplishments with special comments ($r = .49$) and using print to label objects in the room ($r = .41$). High correlations were reported for providers that encouraged children to use language (.80) and engage in representational thinking ($r = .75$) for genuine purposes ($r = .76$).

Cronbach's alpha of .96 shows very good internal consistency for all items combined on the Group/Family Observation. All item-total correlations for the Group/Family Observation were moderate to high ($r = .55$ to $r = .80$). Overall, these data indicated moderate to high internal consistency for items on the Literacy Environment Checklist ($\alpha = .78$) and the Group/Family Observation ($\alpha = .96$).

While these results do not represent reliability per se, taken together, they do indicate that these scales appear to logically cluster around a common set of characteristics associated with the research in language and literacy.

3.2.3.3. Correlations among the interdependent tools. In Table 5, we report correlations between the two measures that constituted the CHELLO instrument. In this analysis, the variables included the two subscales from the Literacy Environment Checklist, Books and Writing, and the three summary variables from the Group/Family Observation.

Books and Writing subtotals were moderately correlated with each of the summary variables in the Observation. Highest correlations were between the Physical Environment for Learning and Books and Writing

Table 4
Cronbach's alpha for Group/Family Observation data (N = 128)

Composite variable	No. of items	α
Physical Environment for Learning subtotal	11	.909
Support for Learning subtotal	10	.903
Adult Teaching Strategies subtotal	22	.938
Group/Family Observation score	43	.965

Table 5
Correlations of CHELLO subscales ($N = 128$)

Composite variable	Literacy Environment Checklist			Group/Family Observation			
	Books	Writing	Total	Physical Environment	Support for Learning	Adult Teaching Strategies	Total
Literacy Environment Checklist							
Books				.60*	.30*	.41*	.44*
Writing				.46*	.20*	.32*	.41*
Total				.67*	.33*	.47*	.52*
Group/Family Observation							
Physical Environment for Learning	.68*	.61*	.75*				
Support for Learning	.40*	.33*	.47*				
Adult Teaching Strategies	.66*	.58*	.72*				
Total	.67*	.58*	.74*				

* Statistically significant.

($r = .60$ and $r = .47$, respectively); the lowest correlation, though still significant, was between the Support for Learning and Writing ($r = .20$).

Correlations indicated that the two tools were related: total scores for the Literacy Environment were significantly correlated with each summary score on the Observation ($r = .67$, $r = .33$, and $r = .47$, respectively for the Physical Environment for Learning, Support for Learning, and Teaching Strategies). Total scores for the Literacy Environment and the Group/Family Observation were correlated ($r = .52$). This moderate correlation provides support for the fact that the two tools, while complementary, measured somewhat different aspects of the environment, and should be examined separately.

4. Discussion

The Child/Home Environmental Language and Literacy Observation (CHELLO) was designed to measure one aspect of home-based care: the quality of the language and literacy environment. Based on a convergence of research on the ecological and psychological factors associated with early literacy development, the tool was created to examine the physical environment, and the instructional and affective supports for literacy learning in home-base settings. Using the structure of the ELLCO, a widely used measure of language and literacy environments for center-based care, we constructed two interdependent tools to examine the unique characteristics and quality supports for literacy learning that occur in home-based care.

As a result of observing, piloting, and gaining feedback from home-based caregivers as well as specialists in resource and referrals agencies in several cities, the CHELLO demonstrated content validity and appeared to accurately capture language and literacy practices in these settings. In this respect, it represents an extension of previously designed instruments that have been able to examine the physical environmental factors associated with literacy learning (e.g. books in the environment) and the more interactional (e.g. responsive language) and affective supports (e.g. adult affect) that are critically related to children's language and literacy development.

Further, evidence from our analyses indicated that it was possible to reliably observe these characteristics and supports within a reasonable amount of time, approximately 1.5–2 h. Reliability was predicated on the training of observers in a day-long seminar, with sufficient video examples to ensure appropriate calibration to the rubrics throughout the instrument. Subsequent uses of the instrument, like all observational measures, will require the appropriate training of observers who are well-versed in early literacy and early childhood.

Analyses of the internal consistency among items on both the Literacy Environmental Checklist and the Observation indicated moderate to strong correlations. Although there were two items that demonstrated a floor effect (Progress Monitoring and Uses of Print in the Environment) and one item, a ceiling effect (Cognitively Stimulating Toys), most items demonstrated adequate range and variability. Further, total scores on the Literacy Environment and Group/Family Observation tools were moderately to strongly related, providing some support for the fact that these instruments tapped

somewhat different aspects of the environment which can be analyzed separately. At the same time, it also indicated their interdependence in assessing the language and literacy environment.

There is still much work to be done, however, to determine the utility and reliability of CHELLO. Although the internal consistency among the items was substantial, we were unable to carry out a factor analysis due to the sample size, which would have been a preferred way to demonstrate the structural validity of the measure. To assess reliability of the measure, short-term test–retest still needs to be accomplished. In addition, further research is needed to examine its potential relationship with well-established measures in the field, such as the Family Day Care Rating Scale (FDCRS) (Harms et al., 2007) to better understand how the language and literacy environment might relate to the overall quality of home-based care.

Possibly the most important test of the tool awaits further analyses: to evaluate the quality of the language and literacy supports in the home with its capacity to predict children's literacy development. Given that children in many of these settings are in multiple care arrangements, this analysis must be conducted with care, recognizing the wide variations in attendance patterns in home-based care. Some of the children in our study, for example, experienced both center-based and home-based care; in other cases, children attended their home-based care setting for as many as 12 h per day.

Although the development and validation of the CHELLO was based on the extant literature, experiences of exemplary teaching, and feedback from supervisors in the field, our analysis was confined to home-based settings in high poverty communities. Further research is needed, therefore, to examine its application to a wider variety of community settings and its sensitivity to tap quality language and literacy environments that might occur in moderate to higher-income areas. In addition, our analysis was restricted to paid family and group care, and not the broader context of kith and kin. Given the enormous numbers of children in kith and kin care (Kids Count Data Book, 2005) it is essential to collect additional evidence of its validity and reliability in more informal care settings as well.

Further research will be needed to determine the utility of the instrument in helping supervisors in home-based programs, as well as its potential for family literacy programs and community-based agencies to examine, evaluate, and improve environmental changes in these child care settings. Such an instrument might prove highly useful in quantifying the effects that varying degrees of professional development or other interventions might have on improving practices and ultimately child outcomes.

Nationally, approximately 1.5 million children under age six are receiving their care exclusively in home-based settings, with an additional five million splitting their time between these and other arrangements (Kids Count Data Book, 2005). Despite these sizable numbers and the nation's concern that all children come to school ready to learn, there have been strikingly few organized efforts (Doherty et al., 2006) to improve and enhance the quality of the care these settings deliver. Measuring the quality of the language and literacy environment, therefore, represents an initial but important first step in strengthening and reinforcing their effectiveness, and in providing greater opportunities for children – particularly those who come from low-income circumstances – to achieve the language and literacy skills they will need to succeed in school.

Appendix A. Sample items on the CHELLO*

Literacy Checklist

I. BOOK AREA

1. Is an area set aside for book reading?
   If there is no book area, move to Section II.

	Area <u>shared</u> with	
Dedicated book area	**other materials**	**No area**
2	1	0

2. Is the book area orderly and inviting?
   For example, the books are organized and displayed on a bookshelf or bookcase.

Yes	**No**
1	0

3. Is the book area comfortable?
   For example, there are items like pillows, cushions, or soft materials in the area so that children can look at books comfortably.

Yes	**No**
1	0

4. Are books in the book area easily accessible to children?
   For example, children can reach books on their own, without adult assistance.

Yes	**No**
1	0

BOOK AREA TOTAL: _____

Provider Interview:

How do you view your role with the children? If you could use one word to describe your relation to the children, what would that be? (Related to Classroom Observation Elements: II.1, II.2, II.3, III.2)
Probe: Do you see your primary role as provider? Nurturer? Helper? What special strengths do you bring to this role?

Group/Family Observation
I. The Physical Environment for Learning

	5 4 Exemplary	3 2 Basic	1 Deficient
1. Organization of the Environment	There is **strong** evidence of an intentional approach to the organization of the physical environment.	There is **some** evidence of an intentional approach to the organization of the physical environment.	There is **minimal** evidence of an intentional approach to the organization of the physical environment.
Evidence: *Status and organization of furnishings, observations of traffic flow, activities and materials available to children.* **Notes:**	*a. Environment is clean, and in good repair with adequate lighting, space, and temperature control.* *b. Environment is intentionally organized with cognitively stimulating interest areas that support language and literacy development.* *c. Furnishings are child-oriented, and age appropriate.* *d. Space is available for children to engage in active learning and movement as well as for quiet reflection and relaxation.*	*a. Environment is mostly clean, and in good repair with adequate lighting, space, and temperature control.* *b. Environment is for the most part intentionally organized with cognitively stimulating interest areas that support language and literacy development.* *c. Some furnishings are child-oriented, and age appropriate.* *d. Some reorganization of space may be needed to better allow children to engage in active learning and movement or for quiet reflection and relaxation.*	*a. Environment is not as clean as would be appropriate for children. Some furnishings may require repair and there is inadequate lighting, and temperature control.* *b. Environment is not organized with cognitively stimulating interest areas appropriate to the ages of children served by the provider (i.e. writing table, toy rack).* *c. Furnishings do not appear to be child-oriented, and age appropriate.* *d. The room may be too barren or crowded for children to engage in active learning and movement or for quiet reflection and relaxation.*

*CHELLO may be purchased through Paul H. Brookes Publishers, Baltimore MD.

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