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Preschool contexts and teacher interactions: Relations with school readiness

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ABSTRACT

The majority of early education programs promote children's learning through a mix of experiences in child- and teacher-managed contexts. The current study examined time spent in child- and teacher-managed contexts and the nature of children's experiences with teachers in these contexts as they relate to children's skill development. Participants were preschool children ($N = 283$, M age = 52 months, 48% girls, 70% Mexican or Mexican American) from families of a lower socioeconomic status. Observations captured children's time in child- and teacher-managed contexts and experiences with teachers in each context. School readiness was assessed directly and through teacher reports. *Research Findings:* Time spent in teacher-managed contexts was positively related to children's academic and social skill development. Experiences in child-managed context predicted vocabulary, math, and social skills when teachers were directly involved with children. Overall, the findings suggest that teacher engagement is related to positive outcomes even during child-managed activities. *Practice or Policy:* Given these findings, preservice and professional development programs for early childhood educators should have a component that focuses on how to enhance the teacher's role during child-managed activities.

Preschool classrooms foster children's learning experiences through a variety of means—the nature of activities and materials present, interactions with peers, and the behaviors of teachers. For young children in particular, the extent to which a child's engagement in an activity is managed by the teacher or self-managed is an important distinction (Connor, Morrison, & Slominski, 2006). Evidence suggests that children acquire knowledge and skills through experiences in both child- and teacher-managed contexts (Hirsh-Pasek & Golinkoff, 2011), and early education programs typically allot time to both ways of structuring children's opportunities to learn (Chien et al., 2010; Early et al., 2010; Fuligni, Howes, Huang, Hong, & Lara-Cinisomo, 2012; Winton & Bussye, 2005). For example, in a study of more than 700 state-funded early childhood education programs (15% Head Start) across 11 states, children spent almost one third of their time in free-choice or child-managed activities, with half of their time in teacher-managed activities (i.e., individual, small group, large group) and the rest in classroom routines such as meals, transitions, and clean up (Chien et al., 2010). In addition, the majority of Head Start programs follow the Creative Curriculum for Preschool, which suggests that “because children have unique learning styles and needs” teachers should utilize both child- and teacher-managed approaches (Dodge, Colker, Heroman, & Bickart, 2002, p. 173).

Despite the fact that both child- and teacher-managed contexts are used as a means of fostering children's skills, little is known about the nature of children's experiences with teachers in these two important early educational contexts and whether children's time and experiences in either context may be important for fostering school readiness. It is important to note that in both child- and teacher-managed contexts, teacher-child interactions likely play a significant role in the quality of experiences children have and the outcomes associated with these. Theory and research suggest that different teacher interactions (e.g., instruction vs. play) are productive for children's learning in different domains (see Stipek, 2006, for a review). For example, behaviorist theories suggest that basic skills learning, such as learning the alphabet, should be taught through direct instruction interactions, whereas constructivist theories suggest that social skills are developed through scaffolded play interactions (Bransford, Brown, & Cocking, 2000; Vygotsky, 1978). Within child- and teacher-managed contexts, children may experience considerable variation in teacher interactions thought to be related to skill development. However, researchers know little about the extent to which teachers' behaviors within those contexts promote children's learning.

Research examining child- and teacher-managed contexts in preschool can be helpful in guiding educators' use of these contexts. At present, there is considerable variation in the use of child- and teacher-managed contexts in preschool settings, and aside from the degree of choice children are given, there is a lack of clarity regarding children's experiences within these contexts and how they may be related to school readiness outcomes. As an example, Fuligni and colleagues (2012) identified two profiles characterizing teachers' varied use of child- and teacher-managed contexts: (a) a *high free-choice* profile in which the majority of the day consisted of time spent in a child-managed free-choice context combined with relatively low amounts of teacher-managed activities and (b) a *structured-balanced* profile in which the day consisted of relatively equal proportions of child-managed free-choice activities and teacher-managed small- and whole-group activities. Variation in time allocation for these contexts had consequences. Depending on the profile of the classroom, children's engagement in learning activities (e.g., literacy activities and pretend play) varied significantly. For example, children in structured-balanced classrooms had more opportunities than those in high free-choice classrooms to engage in language activities. It is not surprising that these experiences were positively associated with later language scores. Fuligni et al.'s research provides important insights into the roles of different contexts, yet there is still limited information on the consequences of this variation for other types of experiences (i.e., interactions with teachers) and types of skill development (e.g., social skills).

The current study was designed to address these gaps in the literature by examining preschool classroom contexts and their contributions to school readiness. Following Connor and colleagues (2006), we observed children's experiences in and exposure to child-managed and teacher-managed learning contexts. Thus, for the purposes of the present study, a context is *child managed* when children have free or limited choice (e.g., centers) over their activities; contexts are *teacher managed* if children do not have a choice in activities that are provided or led by the teacher. Although there is no single definition of school readiness, it is generally agreed that children's school readiness is composed of social (e.g., positive interactions with peers), school (e.g., school liking/avoidance), and academic (i.e., vocabulary, literacy, and mathematics) competencies (Magnuson, Ruhm, & Waldfogel, 2007). In considering the extent to which children's experiences in child- or teacher-managed contexts are related to skill development, one key metric is time, or the relative proportion of experience in each context. But the value of experience in child- and teacher-managed contexts can be characterized in other ways as well, one of which is with regard to the behavior of the teacher (i.e., play, instructional, conversational). In the present study we aimed to (a) document the time children spend in each context; (b) describe the nature of children's experiences with teachers in each context; (c) explore the extent to which time spent in child/teacher-managed contexts is related

to children's school readiness across five domains (i.e., vocabulary, literacy, mathematics, social skills, and school liking); and (d) examine teacher-child interactions, relevant in both child- and teacher-managed contexts, as predictors of children's school readiness.

Contexts, teacher interactions, and school readiness

To date, only a few studies have examined the effects of time spent in child-managed and teacher-managed contexts on children's skill development (Cabell, DeCoster, LoCasale-Crouch, Hamre, & Pianta, 2013; Chien et al., 2010; Connor et al., 2006; Fuligni et al., 2012). The most relevant study was conducted by Chien and colleagues (2010) using data from the National Center for Early Development and Learning Multi-State Study of Pre-Kindergarten. These researchers examined relations between time spent in child- and teacher-managed contexts and academic skill development for a diverse sample. Results suggested that preschool children with the highest levels of free choice (a child-managed context) made the smallest gains in measures of academic skills from fall to spring. The children who made the largest gains in academic skills were those children with high levels of time spent in the teacher-managed (small- and large-group) context and low levels of free choice. These findings suggest that in classrooms utilizing both child- and teacher-managed contexts, time spent in the teacher-managed context was more effective for academic skills.

Unlike most studies, the Chien et al. (2010) study examined teacher interactions independent of the context. Coders identified whether the context was managed by the children or the teacher and subsequently coded children's interactions with teachers within each context. Analyses revealed that children with high levels of time spent in the child-managed context in which scaffolded interactions took place (i.e., teacher built on child's initiations using visuals, concrete objects, and gestures to help children learn) had greater gains from fall to spring than the children with high levels of time spent in the child-managed context without scaffolded interactions. Examining teacher interactions in the child-managed context is particularly important because there may be significant variability in what teachers do in this context (including everything from instruction to play to a complete lack of supervision) given that they are not leading the activities.

Though the research by Chien and colleagues (2010) has provided important insights into which context is most effective for promoting children's academic skills, there are some important limitations. For example, the Chien et al. study does not provide insights into other domains of school readiness. School readiness involves more than academic skills, and prior research on educational approaches suggests that time spent in child- and teacher-managed contexts may not relate to all types of school readiness in the same way (Hirsh-Pasek & Golinkoff, 2011). Consistent with the Chien et al. study, we expect that greater levels of time spent in a teacher-managed context will be positively related to children's academic skill development (i.e., vocabulary, literacy, mathematics).¹ Time spent in child-managed activities has been more often positively related to measures of social skills and school liking than time spent in teacher-managed activities (see Hirsh-Pasek & Golinkoff, 2011, for a review). Thus, we expect that time spent in the child-managed context, in which children have increased opportunities to engage with peers and in which learning is more likely to be self- or peer initiated, will be positively related to children's social skill development and school liking.

In addition, although the Chien et al. (2010) study disaggregated teacher interactions and context, their latent profile methods prevented the direct examination of teacher interactions within child- and teacher-managed contexts on children's skill development. Rather, children's time spent in child- and teacher-managed contexts was used to create profiles characterized by varying levels of teacher interactions, and these profiles were subsequently related to skill development. Early and colleagues (2010) used the same data as Chien et al. to examine whether teacher interactions were more likely to be play based (i.e., scaffolded) or instructive (i.e., didactic) across child- and teacher-managed contexts; however, this study did not directly relate

teacher interactions within context to children's skill development. It would be useful to understand how different types of teacher interactions (e.g., play, instruction, conversation) within the child- and teacher-managed contexts relate directly with children's skill development.

Consistent with the research on time spent in these contexts, we might expect different types of teacher involvement to be related to children's learning, and these may be similar or different across contexts. For example, we might expect greater levels of time spent in teacher interactions characterized as instructional to be positively related to measures of children's academic skill development (i.e., vocabulary, literacy, mathematics) regardless of context. Similarly, time spent in both child- and teacher-managed contexts characterized by high levels of conversation with teachers would be expected to be positively related to children's vocabulary development. Alternatively, we might expect that teacher interactions characterized as play based would be particularly effective within the child-managed context. We would expect play-based teacher interactions to involve teacher scaffolding of children's peer interactions and to be more enjoyable for children when those interactions are child initiated (Vygotsky, 1978). Thus, we would expect play-based interactions within the child-managed context to be more positively related to school liking and social skill development than those occurring within teacher-managed contexts.

The present study aimed to replicate and expand the work of Chien et al. (2010) and to provide a more fine-grained understanding of the nature and possible impact of experiences in child- and teacher-managed contexts in preschool classrooms. Using intensive observational data from a large study of Head Start children that provides unique and extensive child-level data on time spent in each context, as well as multimethod, multireporter reports of children's skill development, we first describe time spent in child- and teacher-managed contexts and children's experiences with teachers across these contexts. We also examined the extent to which time spent in child- and teacher-managed contexts relates to children's skill development across five domains: vocabulary, literacy, mathematics, social, and school liking. Finally, we examined teacher interactions within the child- and teacher-managed contexts during preschool as a predictor of children's skill development across the five domains.

Method

Participants

Participants were preschool children enrolled in 18 Head Start classrooms in an urban southwestern city and their teachers. Classrooms were selected in collaboration with six Phoenix and Maricopa County Head Start programs. Six classrooms were selected each year for three consecutive academic years (2004–2005, 2005–2006, and 2006–2007) of data collection. Of the 18 classrooms, 10 were half-day (five morning, five afternoon) and eight were full-day classrooms. All teachers had a full-time teaching aide (ratios ranged from 2:11 to 2:20). Teachers were compensated for completing questionnaires for each consented child in their classroom. Across three cohorts, children were recruited 2–3 weeks into the start of the academic school year at prearranged parent meetings. The child consent rate was 99% at recruitment ($N = 308$ out of a possible 311). Children who were chronically absent or who left in the fall semester were dropped from the analyses because of a low number of observations ($n = 25$). In addition, data were collected in three waves over 3 years. Children who repeated preschool during Years 2 and 3 of data collection ($n = 16$) had data collected twice; only data from the second year were used in analyses to prevent dependencies. The final sample consisted of 283 preschoolers (M age = 52 months at the beginning of the fall term, range = 37–60 months).

Almost half of the child participants were girls (48%), and eight of nine teachers (89%) were female. The majority of child participants (70%) were Mexican or Mexican American; 59% primarily spoke Spanish. Relatively few participants were Anglo-American (8%), African American (7%), or Native American (1%). Race/ethnicity was "other" or unknown for the remaining 14% of the sample.

Participants were predominantly of low socioeconomic status (82% below \$30,000). More than half of the children (59%) came from two-parent families, and the rest of the children (41%) were from various types of single-parent homes.

The Head Start classrooms in the current study implemented the Creative Curriculum for Preschool, a scientifically based curriculum (Dodge, Colker, Heroman, & Bickart, 2002). The curriculum is based on 38 objectives for development and learning that are fully aligned with the Head Start child development and early learning framework. Teachers following this curriculum are provided with guidelines for daily practice that include everything from how to interact with children in the classroom to how to organize the daily schedule and physical environment. For example, in the Creative Curriculum classroom, children's toys and materials are organized into 11 interest areas (blocks, dramatic play, toys and games, art, library, discovery, sand and water, music and movement, cooking, computers, and outdoor activities), with each area intended to afford different experiences and opportunities to promote developmentally appropriate skills (Dodge, Colker, Heroman, & Bickart, 2002).

Procedures and measures

To assess the amount of time children spent in child- and teacher-managed contexts and the type and quality of activity involvement, peer interactions, and teacher interactions within the two contexts, we used an intensive brief observational method. In addition, at entry into preschool and at the end of children's preschool year covariate and outcome measures were assessed using multiple measures and multiple reporters, including observer ratings, lead teacher ratings, and direct child assessments.

Observational data

Observational data were collected using a brief observation protocol in which children were observed indoors and outdoors, in 10-s observations, multiple times a day, two to three times a week, over the fall and spring semesters (see Martin et al., 2013). The 10-s observational protocol has been extensively used to study children's natural interactions at school and has been found to be a reliable and valid indicator of children's social behaviors and interaction (see Martin & Fabes, 2001). Trained classroom observers (eight to 10 per year; 92% female) began each day at the top of a randomized list of children (that was reordered mid-semester to prevent biases); found the first child on the list; and noted whether the child was present and available for coding, present but unavailable for coding (e.g., in the restroom), or absent. Next coders recorded whether the target child was involved in child-managed (i.e., children have free or limited choice [e.g., centers] over their activities) or teacher-managed (i.e., children do not have a choice in activities that are provided or led by the teacher in small or large groups) activities. The observer would then complete a 10-s observation of the primary activity in which the child was engaged (e.g., blocks), the number of peer partners (up to a maximum of 5), the quality of activity engagement (e.g., constructive), the quality of the peer interaction (e.g., parallel play), whether a teacher was present (i.e., within a 5-foot radius), and whether the child interacted with the teacher (e.g., talking to teacher). After entering the data, the observer then moved to the next child on the list. The observers would complete the entire list and then begin at the top again. To determine reliability, two observers independently coded the same child's behavior. During reliability coding, observers rotated through the class list to ensure that reliabilities could be calculated for each child. A total of 6,480 10-s observations, or 10% of the total observations, were simultaneously coded by two independent observers to obtain kappas for the study variables. Specific kappas for observed variables are reported later.

For the 283 children participating in the present study, a total of approximately 64,600 10-s observations were collected across the fall and spring semesters in 3 years of data collection ($M = 229.20$ observations per child, $SD = 81.64$; range = 36–406). Approximately 39,700 (61%) of

those observations were collected in a child-managed context ($M = 140.81$ observations per child, $SD = 59.57$; range = 30–316). The large range in the number of observations across children was due to differences in their attendance and availability.

Child- and teacher-managed context data

The number of times a child was observed engaging in child-managed context was summed and divided by the total number of times that child was observed (including both child-managed and teacher-managed contexts). This composite provided an assessment of the proportion of time children spent in the child-managed context (the inverse was the proportion of time children spent in the teacher-managed context). Calculation of the proportion score controlled for variations due to child attendance and availability.

Teacher–child interactions

During observations in which the teacher interacted directly with the target child, the nature of the teacher–child interaction was assessed using seven codes: comforting, conversation, discipline, instruction, instrumental help, no direct interaction, and play. Teacher interactions were coded as *comforting* ($\kappa = .82$) if, for example, the target child had hurt himself or herself and the teacher was hugging the child during the observation. Observations in which the teacher was observed talking to the child but not teaching anything specifically were coded as *conversation* ($\kappa = .73$). When the teacher was observed correcting the child's behavior, such as saying "Use your words" or "Stop," the teacher interaction was coded as *discipline* ($\kappa = .66$). The teacher interaction was coded as *instruction* ($\kappa = .78$) when the teacher was observed providing the child with directions for an activity, providing an explanation of how to do something or how something works, or teaching specific concepts. *Instrumental help* ($\kappa = .58$) was coded when teachers were observed helping children with basic needs, such as tying shoes or washing hands. Finally, *play* ($\kappa = .69$) was coded when the teacher was observed playing with the target child in an activity, such as playing a game, building with blocks, or pretending but not instructing or teaching a specific concept or skill.

To compute scores for teacher–child interactions that occurred within child- and teacher-managed contexts, we created relative proportion scores for teacher–child interactions within separate child-managed and teacher-managed contexts data files by totaling the number of times a child was observed in each category and dividing by the total number of observations within that particular context. For example, the relative proportion score for teacher–child interactions in the child-managed context was created by summing the total number of times a child was observed interacting with a teacher characterized in a specific way (e.g., conversation) in the child-managed context and dividing by the total number of observations in the child-managed context. A matching proportion score for each teacher–child interaction in the teacher-managed context was also created. Relative proportion scores were utilized to standardize the observations and account for differences in the total number of observations in each context and across children.

Covariates

Observer ratings and direct assessments of children's school readiness skills at entry into preschool (fall semester) were utilized as covariates in analyses examining how child/teacher-managed contexts relate to skill development. Classroom observers completed questionnaires composed of single items reflecting children's affective and social readiness. Children's verbal abilities (Peabody Picture Vocabulary Test [PPVT]) were also directly measured at the beginning of the preschool year as a proxy for academic readiness.

Global observer ratings

Classroom observers completed a global assessment of behavior for each participating child four times throughout the year. For use as covariates, only the observations collected during the first semester (fall) were included. The questionnaire included single items rated on a 5-point scale (1 = *not at all true* to 5 = *very true*) regarding the degree to which each item described the target child: “enjoys school,” “warmth towards primary teacher,” “angry,” “impulsive,” “aggressive,” “socially competent,” “victimized,” “positive emotion,” “shy,” “compliant,” and “disruptive.” Each item was collected halfway through the fall semester and at the end of the fall semester. For all items, the two fall time points were combined to create an average score and a single item for that rating.

PPVT

To account for children’s verbal ability at entry into preschool, the PPVT-III (Dunn & Dunn, 1997) and the Spanish equivalent of the test (the Test de Vocabulario en Imágenes Peabody (TVIP); Dunn, Padilla, Lugo, & Dunn, 1986) were administered at the beginning of the fall semester. Children were assessed in either English or Spanish based on teachers’ recommendations (52% were assessed in English and 48% were assessed in Spanish). The TVIP was developed using the most appropriate items from the PPVT-III for a Spanish-speaking population. The PPVT-III and TVIP have the same number of total questions and most questions are identical, although some items differ between versions. Both tests are reliable and valid measures of children’s vocabulary knowledge (Dunn & Dunn, 1997; Dunn et al., 1986). Within the present study, raw scores (the sum of all correct responses) on the PPVT-III and TVIP were used because the standardized scores were normed on different populations and were not comparable.

School readiness outcomes

To examine children’s school readiness at the end of their preschool year, we collected a number of different measures (described here). Lead teachers completed questionnaire packets including measures of children’s social and cognitive skills and the degree to which they enjoyed school. In addition, children’s literacy, math, and language skills were directly assessed.

Child behavior scale (CBS)

Lead teachers reported on each child in their class using the CBS (Ladd & Profilet, 1996). The CBS consists of five subscales related to young children’s behavioral and social competence: (a) Asocial Behavior, (b) Hyperactive-Distractible, (c) Exclusion by Peers, (d) Prosocial With Peers, and (e) Socially Anxious-Fearful Behavior. Lead teachers rated children on a 3-point scale (1 = *doesn’t apply* to 3 = *certainly applies*). Only the Asocial Behavior, Exclusion by Peers, and Prosocial With Peers subscales were used in the current study because the focus was on social skills (or lack of social skills). These three subscales showed good reliability and validity ($\alpha = .87-.88$) and were correlated significantly in the expected direction. Accordingly, a CBS social development composite was created.

Penn interactive peer play scales (PIPPS)

Another measure of children’s social skills was a modified version of the PIPPS (Fantuzzo, Gaudio Weiss, Atkins, Meyers, & Noone, 1998). Lead teachers were asked to indicate on a 4-point scale (1 = *never* to 4 = *always*) how frequently they observed various peer interactive behaviors in a particular child. Three reliable dimensions of the PIPPS have been identified, and these were used in the present study: (a) Play Interaction (children’s play strengths), (b) Play Disruption (behaviors that interfere with peer play—aggression, destroying others’ property, etc.), and (c) Play Disconnection (nonparticipation in peer play). The PIPPS has been widely used, and the modified version showed good reliability and validity with the current sample ($\alpha = .83-.92$). The PIPPS subscales were

significantly correlated, and, consistent with the composite created for the CBS, a composite was created by summing the raw subscale scores and dividing by 3.

Teacher developmental profile (TDP)

Lead teachers completed a 40-item questionnaire, the TDP, to assess young children's social and academic skill development (Fabes, Martin, Hanish, Anders, & Madden-Derdich, 2003). They were asked to compare each child to the other children in his or her class and rate him or her on a variety of skills, including (a) reading and writing, (b) logical thinking and use of numbers, and (c) social development. Each item was judged using a 4-point scale (1 = *not yet* to 4 = *proficient*) reflecting the degree to which the child had accomplished a particular skill or behavior (e.g., "can recognize numbers from 1 to 20," "enjoys being in school"). The subscales showed good internal reliability in the current sample ($\alpha = .92-.93$).

Teacher rating scale of school adjustment (TRSSA)

Lead teachers completed an adapted version of the TRSSA (Birch & Ladd, 1997). The original 52-item measure was reduced to 21 items that tapped subscales including the School Liking (e.g., "likes to come to school") and School Avoidance (e.g., "makes up reasons to go home from school") subscales. Teachers rated the degree to which items described the child using a 3-point rating scale (1 = *doesn't Apply* to 3 = *certainly Applies*). To assess the degree to which children enjoyed school, we created a composite for the School Liking and School Avoidance subscales; these subscales had good internal consistency ($\alpha = .84$ and $.65$, respectively).

Woodcock-johnson III tests of achievement (WJ-III)

Children were assessed in the spring using subscales from the WJ-III (Woodcock, McGrew, & Mather, 2001; Spanish equivalent, Bateria-III, Muñoz-Sandoval, Woodcock, McGrew, & Mather, 2005) that were developmentally appropriate for preschool children. Children were administered three subscales: (a) Word Identification (e.g., naming letters and reading words aloud from a list), (b) Passage Comprehension (e.g., orally supplying the missing word removed from a sentence or very brief paragraph), and (c) Applied Problems (e.g., mathematics word problems). The subscales were administered in children's preferred language, English or Spanish (a total of 48% of the children chose to take the test in Spanish). The WJ-III subscales provide two types of scores: the standard score and the *W* score. The latter scores (converted raw scores) are a transformation of the Rasch ability scale and were utilized in the current study because they are compatible across both versions of the test (i.e., English and Spanish). Muñoz-Sandoval et al. (2005) used item response theory methods with 2,000 Spanish-speaking individuals and concluded that equal levels of competence were being measured by both the English and Spanish assessments (Woodcock & Muñoz-Sandoval, 1993, 1996). Research has shown that the WJ-III and the Bateria-III are both reliable and valid measures of children's achievement and yield comparable scores (Schrank, McGrew, Ruef, & Alvarado, 2005; Schrank, McGrew, & Woodcock, 2001).

Attrition, missing, and multilevel data

Of the 283 children with complete data in the fall of their preschool year, 243 children had complete data on all outcome measures of school readiness in the spring of their preschool year. A total of 40 children had some amount of missing data on the outcome measures. Cross-tabulation analyses and independent-samples *t* tests showed that children for whom complete data were not available did not differ from the children with complete data on language of direct assessment (English or Spanish), family income (high or low poverty; high poverty = family socioeconomic status less than \$30,000 per year), gender (girl, boy), covariates (i.e., initial verbal ability and observer ratings), or any of the predictor variables. There were, however, significant differences between children with complete data and children with missing data on ethnicity and age: ethnicity, $\chi^2(1) = 15.34, p \leq .05, N = 283$; age, *t*

(281) = 2.57, $p \leq .05$. Specifically, non-Hispanic children were more likely than Hispanic children to have missing data. Furthermore, children with missing data (M age = 50.33) were significantly younger than children with no missing data (M age = 52.52).

The path analyses (described below) were conducted with Mplus 6 (Muthén & Muthén, 1998–2010), which uses a full information maximum likelihood estimation method to generate estimates based on the available, observed data. The missing-at-random assumption was believed to be reasonable for these data because few significant differences were found between participants with missing data and participants with complete data, and those variables that differed significantly (age and ethnicity) were included in the model as covariates or auxiliary variables to increase the likelihood that the missing-at-random assumption was not violated (Enders, 2010).

Because the data used in the present study were clustered within teacher/classroom, the study variables were examined for potential differences that related to children's teacher/classroom. Design effects for the outcome measures (CBS, PIPPS, TDP, TRSSA, WJ-III) ranged from 2.06 to 4.83, suggesting that there were dependencies in the data within teacher/classroom. Ideally, multilevel analyses (using Mplus) would have been utilized to analyze the clustered data. Unfortunately, a minimum of 30 clusters of analysis is the recommended rule of thumb for multilevel analyses, and the current study had only 18 teachers/classrooms (Bell, Ferron, & Kromrey, 2008). It was possible to account for clustering by including children's teacher/classroom as a covariate in analyses testing the study hypotheses; however, this method was not utilized because a large portion of the variance in children's outcomes that would have been accounted for by controlling for children's teacher/classroom would have been overlapping with the variance that would have been accounted for by the variables of interest—namely, time spent in the child-managed context and teacher interactions within that context. For these reasons, no techniques were used to address the multilevel nature of the data.

Results

Preliminary analyses examined the descriptive statistics, skewness, and kurtosis of all path analysis variables (see Table 1). Repeated measures analyses of variance and follow-up analyses were conducted to test for differences in outcome variables due to children's ethnicity, language of direct

Table 1. Descriptive Statistics for Time Spent in the Child-Managed Context, Teacher Interactions in Both Contexts, and Outcomes.

<i>Variable</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>	<i>Skewness</i>	<i>Kurtosis</i>
Proportion of time spent in the child-managed context	283	0.61	0.10	0.37	0.92	−0.04	−0.42
Teacher interactions within the child-managed context							
Play	283	0.26	0.17	0.00	0.82	0.46	−0.51
Instruction	283	0.22	0.13	0.00	0.71	0.81	1.15
Conversation	283	0.21	0.14	0.00	0.67	0.33	−0.25
Teacher interactions within the teacher-managed context							
Play	283	0.02	0.04	0.00	0.44	4.28	30.98
Instruction	283	0.70	0.14	0.29	1.00	−0.30	−0.16
Conversation	283	0.13	0.10	0.00	0.44	0.62	−0.21
Outcome Subscales and Composites							
WJ-III Word Identification subscale	250	328.63	22.84	264.00	388.00	−0.10	−0.44
WJ-III Passage Comprehension subscale	250	389.43	33.91	255.00	441.00	−1.84	3.75
WJ-III Applied Problems subscale	250	395.33	24.76	301.00	444.00	−0.61	0.69
TDP Reading and Writing subscale	259	2.58	0.67	1.11	4.00	−0.03	−0.68
TDP Logic and Numbers subscale	261	3.09	0.63	1.30	4.00	−0.55	−0.34
TDP social development	262	3.13	0.67	1.17	4.00	−0.41	−0.44
CBS composite	262	2.58	0.31	1.57	3.00	−0.85	0.40
PIPPS composite	262	2.48	0.42	1.42	3.24	−0.40	−0.56
TRSSA composite	259	2.59	0.19	1.80	2.70	−2.00	3.40

Note. Valid N (listwise) for outcomes = 243. WJ-III = Woodcock–Johnson III Tests of Achievement; TDP = Teacher Developmental Profile; CBS = Child Behavior Scales; PIPPS = Penn Interactive Peer Play Scales; TRSSA = Teacher Rating Scale of School Adjustment.

assessment, family income, and gender. Significant differences were found between girls and boys on the study variables, $F(1, 241) = 25.37, p < .001$. Head Start teachers rated girls higher on all measures than they rated boys, and girls outperformed boys on all direct assessment measures. Accordingly, child gender was included as a covariate in the path analyses. Given that age, initial verbal ability, and observer ratings were related to several outcome variables, all four variables were included as covariates in path analyses.

Time spent in child-managed and teacher-managed contexts

Children spent more time on average in the child-managed (61%) than in the teacher-managed (39%) context. Although on average children were observed spending about 61% of their time in the child-managed context, there was considerable individual variability; some children spent as much as 92% of their time in this context, whereas others spent as little as 37% of their time in the child-managed context. Mean levels for the proportion of time spent in child- and teacher-managed contexts suggested variation at the classroom level as well. Of 18 classrooms, only one classroom spent a larger proportion of time in the teacher-managed compared to the child-managed context. Classroom means ranged from 46% to 81% of time spent in the child-managed context or 19% to 54% of time spent in the teacher-managed context.

Teacher–child interactions across contexts

Another goal of the current study was to describe children’s experiences with teachers within child-managed and teacher-managed contexts. A repeated measures multivariate analysis of variance was conducted with two within-subject factors—the context (child managed and teacher managed) and teacher–child interactions (play, instruction, conversation, comforting, instrumental help, discipline). Results revealed a significant main effect for context that was subsumed by a two-way interaction between context and teacher–child interactions, $F(5) = 820.27, p \leq .001, df = (5, 1400)$. To further analyze the specific experiences that differed significantly across contexts, we used paired t tests (within subjects) to make pairwise comparisons of teacher–child interactions across child- and teacher-managed contexts (see Table 2). Teacher interactions characterized as play, conversation, comforting, discipline, and instrumental help were observed more in the child-managed context compared to the teacher-managed context. In the teacher-managed context compared to the child-managed context, children were more likely to have teacher interactions that were characterized as instruction.

Proportion of time spent and teacher–child interactions on child outcomes

Path analyses in a structural equation modeling framework were used to test two other goals of the current study. One model was run to examine relations between proportion of time spent in the

Table 2. Descriptive Statistics for Teacher–Child Interactions Across Contexts.

<i>Teacher Interaction</i>	<i>Child Managed</i>		<i>Teacher Managed</i>	
	M	SD	M	SD
Play	0.26 _a	0.17	0.02 _a	0.04
Instruction	0.22 _b	0.13	0.70 _b	0.14
Conversation	0.21 _c	0.14	0.13 _c	0.10
Comforting	0.03 _d	0.05	0.01 _d	0.02
Instrumental help	0.11 _e	0.12	0.02 _e	0.03
Discipline	0.06 _f	0.09	0.04 _f	0.05

Note. Items with the same subscript differ significantly from the child-managed to teacher-managed context at $p \leq .05$. Mean values are based on proportion scores ranging from 0 to 1. Significant t tests (280) ranged from 2.18 to 45.54, $ps \leq .001$.

child/teacher-managed context and children's skill development. Two additional models were run to examine relations between specific teacher interactions within context; only the teacher interaction variables play, instruction, and conversation were of interest, and all three were entered in the same model.² All path models were examined including covariates—children's gender, age, initial verbal abilities, and observer ratings—to determine the amount of variance accounted for in outcome measures by the predictors above and beyond child-level characteristics. Although no significant differences were found on the study variables between Hispanic and non-Hispanic children, missing data patterns did differ significantly for these groups; accordingly, ethnicity was included as an auxiliary variable. Model fit was evaluated with the chi-square statistic, the comparative fit index (CFI), standardized root-mean-square residual (SRMR), and root mean square error of approximation (RMSEA).

Proportion of time spent in child/teacher-managed contexts

It was hypothesized that time spent in the child-managed context would be significantly positively related to measures of social skills and school liking. The hypothesized relations were not supported. Contrary to our expectations, there were significant negative relations between time spent in the child-managed context and all measures of social skills, PIPPS, CBS, and TDP social development. Time spent in the teacher-managed context was positively related to teacher-rated measures of literacy and mathematics, consistent with our hypotheses. The model showed adequate fit to the data (see Figure 1).

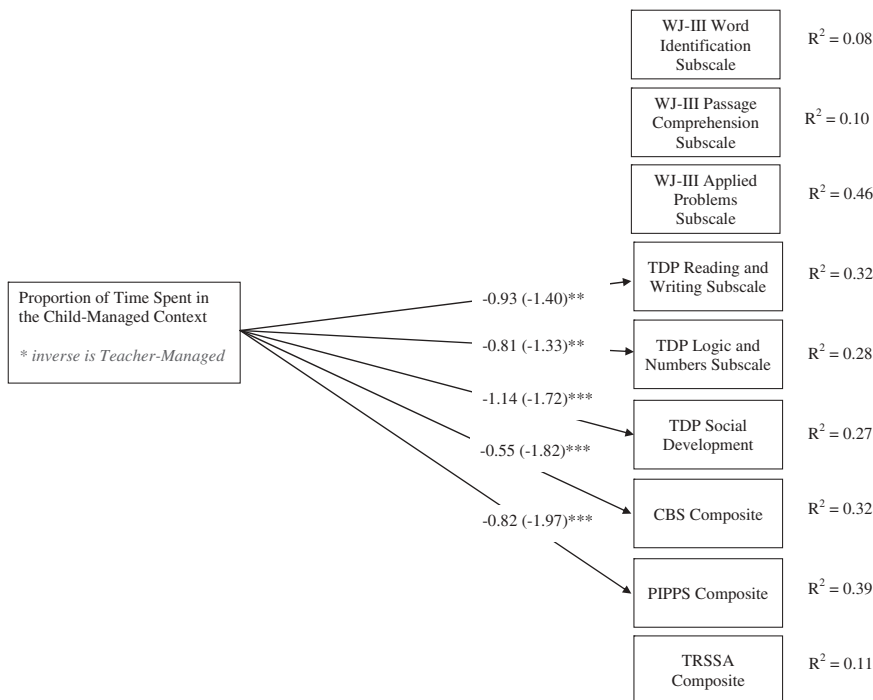


Figure 1. Path analysis examining relations between time spent in the child-managed context and children's outcomes. Unstandardized and standardized (in parentheses) beta estimates and p values for unstandardized betas are reported. R^2 (the proportion of variance accounted for in each variable by its predictors) is reported for endogenous variables. Outcome variables were regressed on child gender (male = 1, female = 2); age; initial verbal ability; and observer ratings for enjoys school, warmth toward primary teacher, angry, impulsive, aggressive, socially competent, victimized, positive emotion, shy, compliant, and disruptive. Ethnicity (Hispanic, non-Hispanic) was included as an auxiliary variable. $\chi^2(45) = 71.73$, $p = .01$, $N = 283$, comparative fit index = .98, root mean square error of approximation = .05, standardized root-mean-square residual = .02. WJ-III = Woodcock-Johnson III Tests of Achievement; TDP = Teacher Developmental Profile; CBS = Child Behavior Scales; PIPPS = Penn Interactive Peer Play Scales; TRSSA = Teacher Rating Scale of School Adjustment. ** $p \leq .01$. *** $p \leq .001$.

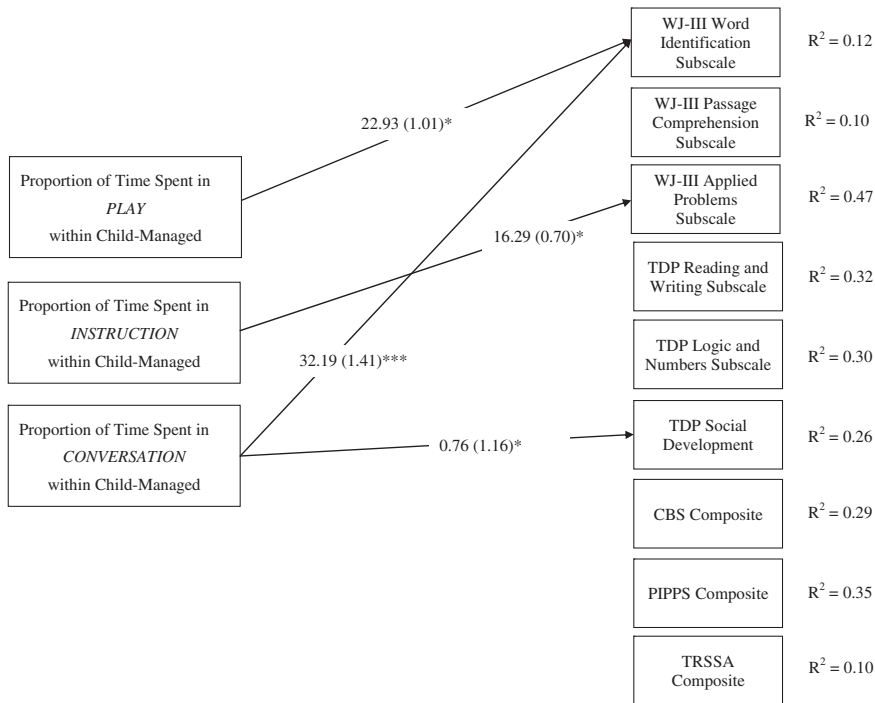


Figure 2. Path analysis examining relations between teacher interactions within the child-managed context and children's outcomes. Unstandardized and standardized (in parentheses) beta estimates and p values (one-tailed for hypothesized paths) for unstandardized betas are reported. R^2 (the proportion of variance accounted for in each variable by its predictors) is reported for endogenous variables. Outcome variables were regressed on child gender (male = 1, female = 2); age; initial verbal ability; and observer ratings for enjoys school, warmth toward primary teacher, angry, impulsive, aggressive, socially competent, victimized, positive emotion, shy, compliant, and disruptive. Ethnicity (Hispanic, non-Hispanic) was included as an auxiliary variable. $\chi^2(45) = 63.63, p = .04, N = 283$, comparative fit index = .99, root mean square error of approximation = .04, standardized root-mean-square residual = .02. WJ-III = Woodcock-Johnson III Tests of Achievement; TDP = Teacher Developmental Profile; CBS = Child Behavior Scales; PIPPS = Penn Interactive Peer Play Scales; TRSSA = Teacher Rating Scale of School Adjustment. * $p \leq .05$. *** $p \leq .001$.

Teacher interactions within child/teacher-managed contexts

For the models examining teacher interactions within the child-managed and teacher-managed contexts, several hypotheses were proposed. Teacher-child interactions that were coded as play based within the child-managed context were expected to be significantly positively related to measures of social skills and school liking above and beyond the other measures of teacher interactions and covariates. This hypothesis was not supported. It is interesting that play with teachers in the child-managed context was only a significant positive predictor of children's vocabulary (WJ-III Word Identification). (See Figure 2 for relations between teacher interactions within the child-managed context and school readiness skills.) Teacher interactions coded as instruction within the child- and teacher-managed contexts were expected to be significantly positively related to teacher reports of literacy and mathematics and direct assessments of children's vocabulary, literacy, and mathematics skills. This hypothesis was only partially supported for teacher instruction within the child-managed context. The proportion of time teachers spent instructing in the child-managed context was positively related to the direct assessment of children's mathematics skills (WJ-II Applied Problems). Teacher interactions in the child- and teacher-managed contexts coded as conversation were hypothesized to be positively related to the direct assessment of children's vocabulary above and beyond the other measures of teacher interactions and covariates. In partial support of the hypothesis, teacher-child interactions in the child-managed context characterized as conversational were significantly related to the direct

assessment of children's vocabulary (WJ-III Word Identification). It is interesting that conversation within the child-managed context was also significantly related to teacher reports of social development (TDP social development). No significant relations emerged for teacher interactions within the teacher-managed context and children's school readiness skills.

Discussion

The current study aimed to inform early education instruction by examining time spent and teacher interactions within child- and teacher-managed instructional contexts. The child- and teacher-managed contexts proved to be significantly different in terms of the types of interactions children had with teachers. In addition, time spent in the child- and teacher-managed contexts related significantly to children's school readiness across multiple domains. Finally, evidence suggested that the child-managed context was a particularly effective context for children's skill development when teachers were engaged with children during those activities.

In the sample of Head Start classrooms examined in the current study, the child-managed context occurred more frequently than the teacher-managed context (children were not observed during routine activities). These findings differ from previous research on children in state-funded prekindergarten programs (including 15% Head Start classrooms) who were observed in child-managed play activities 38% of their time and teacher-managed individual, small-group, and large-group activities 62% of their time (Chien et al., 2010). The discrepancy between how teachers structure preschool children's schedule may be due to a stronger academic focus in state-funded prekindergarten programs (i.e., more teacher-managed activities) compared to Head Start programs, which have emphasized the development of the whole child, including academic, physical, and social/emotional domains (i.e., are more child centered; U.S. Department of Health and Human Services, 2010).

The discrepancy between the Chien et al. (2010) findings and the current results may also be due to differences in the sample characteristics. Chien and colleagues sampled prekindergarten children enrolled in state-funded programs across 11 states that were diverse in terms of ethnicity, socioeconomic status, and urbanicity. The majority of participants in the present study were Head Start children from families of a lower socioeconomic status who were Mexican or Mexican American, living in urban communities in the Southwest. Thus, the present sample was more homogeneous than the Chien et al. sample. Moreover, the present sample represented a very specific sociocultural group that is uniquely characterized by such features as immigration status, language, country of origin, and socioeconomic status. It has been demonstrated that low-socioeconomic status, ethnic minority children tend to enter Head Start classrooms with more behavior problems than their more affluent peers (Huaqing Qi & Kaiser, 2003; U.S. Department of Health and Human Services, 2003). Behavior problems can be disruptive to the classroom environment and impede learning, especially during direct instruction activities (Rimm-Kaufman, Pianta, & Cox, 2000). Thus, it is possible that the Head Start teachers in this sample chose to allot more time for child-managed activities than teachers in state-funded prekindergarten programs because of difficulties managing teacher-led activities. Consistent with this idea, Carr, Taylor, and Robinson (1991) suggested that if students respond to direct instruction with noncompliant behaviors that are aversive to teachers, over time teachers will likely provide direct instruction less often.

The current research findings suggest that the child-managed context provided children with a wider range of teacher-child interactions than the teacher-managed context, which was primarily characterized by instruction (70%). Given theory and research suggesting that different types of teacher interactions may foster skill development in distinct domains, the descriptive results of the current study suggest that time spent in the child-managed context, the context that promoted a broader range of teacher-child interactions, should have led to more positive

social and cognitive development than the time spent in the teacher-managed context. What is interesting, however, is that time spent in the child-managed context was negatively related (and, inversely, time spent in the teacher-managed context was positively related) to teacher reports of children's academic and social skills.

It is not surprising that the current findings are consistent with the research supporting a positive relation between teacher-led instruction activities and academic skill development (e.g., Chien et al., 2010). It is difficult to know, however, whether poor social skills lead to more time in the child-managed context or whether more time in the child-managed context actually leads to negative social skills. As mentioned previously, teachers in classrooms characterized by children with behavior problems who are disruptive and not very responsive to instruction may decrease time allocated for teacher-managed activities and increase time in child-managed activities. Overall, there may be more opportunities for teacher-managed activities for children who display more positive social skills, explaining the positive relation between time spent in the teacher-managed context and social skills.

Another possible explanation for the negative relations between the child-managed context and social skills could be that children's interactions with peers in the child-managed context were negative or conflictual. Indeed, longitudinal research consistently links poor peer interactions with negative social development (Denham & Holt, 1993; DeRosier, Kupersmidt, & Patterson, 1994). Children's interactions with peers during preschool represent the first opportunity that many children have to develop peer interaction skills, such as cooperation and conflict resolution skills. Because teachers may or may not be present during child-managed activities, any negative or conflictual peer interactions that arise are potentially unsupervised. Thus, children may not have the necessary tools or assistance to help them resolve negative or conflictual peer interactions.

Following this reasoning, time spent in teacher-managed activities possibly meant less time spent in conflictual or counterproductive unsupervised peer interactions. It is also likely that during small- and large-group activities, if a peer conflict occurred, teachers addressed it quickly to minimize interruption of the instructional activities. In the teacher-managed context, teachers may facilitate children's conflict resolution and problem solving by encouraging skills such as patience and understanding, which may then contribute to children's social skill development. Observational studies examining teacher management of peer interactions in child- and teacher-managed contexts would make an important contribution in this area.

Another potential reason for this link between teacher-managed activities and social readiness may have to do with the focus of instructional content. Head Start has stated goals that focus on the development of the whole child, including the development of social skills in addition to academic skills (U.S. Department of Health and Human Services, 2010). Accordingly, it is possible that Head Start teachers may focus some of their instruction during small and large groups on building social skills. Alternatively, it is also possible that this finding is simply a teacher effect. In other words, teachers who allotted more time for teacher-managed activities may have also rated their children higher on measures of social skills. Future research examining the instructional content Head Start teachers use during teacher-managed activities with multiple reporter measures of social skills would be useful.

Our findings suggest that variations in teacher interactions characterized as play, instruction, and conversation within the child-managed context were positively related to direct assessments of children's language and mathematics skills; however, teacher-child interactions within the teacher-managed context did not differentially relate to outcomes. The lack of findings for teacher interactions within the teacher-managed context is not surprising given the descriptive findings showing low levels of variability around different types of teacher-child interactions in the teacher-managed context (i.e., 70% instruction). It is interesting that although time spent in the child-managed context alone does not positively relate to children's skill development, when teachers constructively interact with children in child-managed activities, these interactions can be particularly beneficial for children's skill development. These findings highlight the

importance of the teacher's role during child-managed activities and support previous intervention work that suggests that when teachers effectively guide children's self-initiated activities, the child-managed context is effective for skill development (e.g., Tools of the Mind; Barnett et al., 2008; Bodrova & Leong, 2009).

Strengths and limitations

The current study expands on existing research in a number of important ways. Observational data of children's time spent in child- and teacher-managed contexts within Head Start classrooms was assessed. This is important because as the descriptive data illustrated, even within a preschool classroom there is variability among children in the extent to which they experience these contexts. Although the observational data used to assess children's time spent in various instructional contexts is a major strength of the current study, because of the demanding data collection required, data were only collected from six Head Start classrooms per year, for 3 years. Thus, a limitation of the study is the low number of units at the classroom level (i.e., 18 teachers/classrooms), which precluded the use of multilevel analyses to examine the goals of this study (Bell et al., 2008). Our study controlled for as many child factors as possible to ensure that classroom differences due to child characteristics were minimized. Still, there are likely interesting patterns of variability within and across teachers/classrooms that could be explored with larger samples. For example, teacher interactions may be more or less effective depending on any number of teacher-level characteristics, such as teaching philosophies or years of experience. Furthermore, aspects of the classroom environment, such as the presence or lack of stimulating materials, likely affect relations between instructional contexts and learning. Accordingly, this research should be replicated with a larger sample of classrooms that would allow for the examination of variability within and across teachers/classrooms in the relations between instructional approach and school readiness outcomes.

The current study further extends previous research by using children from a different ethnic group than those most often studied. The participants in this study were Head Start children who were mostly Mexican or Mexican American and came from families of a lower socioeconomic status. Low-income Mexican/Mexican American children are a large and quickly growing population in the United States, which underscores the importance of understanding the experiences of these children in early education programs, such as Head Start (Kohler & Lazarín, 2007). Although examining school readiness for high-risk populations is an important strength of the current study, one concern for the interpretation of the present results is that the sample from which the results of this study were drawn may not have been representative of the larger population; thus, this potentially limits the generalizability of the results. Furthermore, it is possible that sample characteristics, such as children's preferred language or behavior problems, may have been important moderators in the relations between instructional context and school readiness. Accordingly, future research should replicate the current study in a more heterogeneous sample as well as consider potential moderators of the relations between instructional context and school readiness for Head Start children.

Another major contribution of the current study is examining specific teacher-child interactions within child- and teacher-managed contexts as they relate to children's skill development. Neither Chien et al. (2010) nor Early et al. (2010) examined the direct relations between teacher-child interactions within context and children's learning and development, making the current study the first of its kind. It is important to note, however, that teacher-child interactions are not the only potentially important social interactions for children's learning within preschool contexts. There is considerable research suggesting that preschool children learn important skills from positive peer interactions (Coplan & Arbeau, 2009; Goble et al., 2015; Wentzel, 2009). For example, a recent study examining data from the current sample showed that higher initial levels as well as increases in peer play in preschool settings when teachers were not involved were related to higher levels of school competence in kindergarten (Eggum-Wilkens et al., 2014). Thus, future research examining peer

interactions in child- and teacher-managed contexts could shed light on other ways these contexts may be promoting children's learning and development.

Finally, although the current study used multiple measures of school readiness, including both teacher reports and direct assessment of children's skill development, future research could extend and modify the measures to improve understanding of how child- and teacher-managed contexts relate to school readiness. One approach would be to expand some of the measures to include direct child assessments or multiple reporters. The inclusion of only a single reporter allows for potential biases. As mentioned, it is possible that teachers who spent more time in teacher-managed activities believed that their students were better prepared socially and thus rated them higher on measures of social readiness. In the current study, only academic readiness included measures from multiple reporters (i.e., teacher report and direct child assessment). To reduce potential biases in future research, school liking and social skill measures should also include measures from multiple reporters. Future research should also include initial measures of children's skills in order to assess the degree to which time spent in various contexts affects the development of skills over time.

Conclusion

The major goal of the current study was to extend previous research examining early educational approaches by assessing the relations between child- and teacher-managed activities and children's skill development within Head Start classrooms. There are several important implications of the current research. The descriptive data showed that teacher-child interactions vary significantly across child- and teacher-managed contexts. Furthermore, the results linking the teacher-managed context and social skills suggest that teacher-managed small and large groups may be a particularly beneficial context for Head Start children, who tend to enter preschool with more behavior problems than their more affluent peers (Huaqing Qi & Kaiser, 2003; U.S. Department of Health and Human Services, 2003). There has been some resistance to the downward shift in teacher-led activities in early education programs (Stipek, 2006). Much of this resistance stems from the belief that academic skill development is favored over social skill development in teacher-managed contexts. The findings of the current study suggest, however, that children, at least those who are at risk for academic failure, are also benefitting socially from time spent in teacher-managed activities.

Finally, the results of the current study suggest that teacher engagement is related to positive outcomes even when children are in self-directed contexts. This finding in particular lends itself to important implications and recommendations for policy and practice. For example, many state leaders are developing or updating their Quality Rating and Improvement Systems (QRIS) systems to include the assessment and improvement of high-quality teacher-child interactions. In light of the current findings and similar research suggesting that high-quality teacher-child interactions within the child-managed context are related to skill development (Goble & Pianta, 2015), it would be beneficial if states considered the instructional context when evaluating high-quality teacher-child interactions and make recommendations for improvement across both child- and teacher-managed contexts.

In addition, it is recommended that teachers use an intentional approach within the child-managed context in which goals and objectives are used to facilitate children's learning and development. In many classrooms the child-managed context is a time teachers use for other activities, such as lesson preparation, and children are left to play alone. However, teachers should aim to engage in play, instruction, and conversation during child-initiated activities as a means of teaching skills and concepts. In addition to large-scale interventions for guided play such as Tools of the Mind, teacher preparation programs and professional development activities should focus on enhancing teaching strategies within the child-managed context. One approach would be to give teachers literature about how to effectively facilitate child-initiated activities and the tools to train themselves. For example, self-analyses of classroom videos and other methods of promoting reflection on professional practice have

been shown to be effective in teacher training studies on scaffolding children's learning (Kok, Kong, & Bernard-Opitz, 2002; Schuler & Wolfberg, 2000).

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Notes

1. In the current study the proportion of time spent in the child- and teacher-managed contexts sums to 1. In other words, more time spent in the child-managed context results in less time spent in the teacher-managed context. Thus, a significant positive relation between time spent in the teacher-managed context and readiness outcomes is mathematically equivalent to a significant negative relation between time spent in the child-managed context and readiness outcomes. Accordingly, we would expect a significant negative relation between time spent in the child-managed context and children's vocabulary, literacy, and mathematics skill development in the current study.
2. The variable of teacher interactions characterized as play within the teacher-managed context was skewed and kurtotic because of a low occurrence within this context (see Table 1). Thus, the first model examining teacher interactions within the teacher-managed context, including play, failed to converge. The second model, excluding play, also failed to converge, indicating issues with the standard errors for the direct assessment variables (WJ-III). Thus, a model was analyzed excluding play as a predictor and outcomes for the direct assessment of children's vocabulary (WJ-III Word Identification), literacy (WJ-III Passage Comprehension), and mathematics skills (WJ-III Applied Problems). The final model was a good fit to the data, $\chi^2(18) = 25.85$, $p = .10$, $N = 283$, $CFI = .99$, $RMSEA = .04$, $SRMR = .01$. A follow-up model was run examining only the direct assessments regressed on teacher interactions characterized as conversation and instruction within the teacher-managed context; however, this model had poor fit to the data, $\chi^2(92) = 1,168.21$, $p = .00$, $N = 283$, $CFI = .17$, $RMSEA = .21$, $SRMR = .18$.

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