
Relationships between Play and Learning Practices among Low-Income Families

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The authors examine the relationships between home play and learning—measured by reading and teaching practices at home—among low-income families, including those with mental health issues. Based on a large database from the Family Map Inventory, a screening tool for home visiting programs, the authors' findings revealed that play-related concerns such as play materials, home play, and the variety of play away from home had significant impact. They conclude that care givers who provide children with more play opportunities both at home and away from home tend to read books with children more frequently and to teach them more basic academic skills. This suggests that early play interactions can contribute to early learning and implies that intervention programs such as Early Head Start and home-visiting programs focusing on play may boost a family's resilience and add value to existing services. **Key words:** infant and toddler play; learning and play; mental health and play; play in low-income families

Introduction

SCHOLARS GENERALLY BELIEVE play to be essential and critical in child development, but some have questioned and challenged the effectiveness of play as a learning mechanism (Lillard et al. 2013; Lugo-Gil and Dang 2020; Whitebread 2019). Researchers studying play as a teaching strategy often compare it to their direct instruction aimed at targeted outcomes and with their experimental designs. For example, some have compared play to literacy instruction (Dickinson et al. 2019) and math instruction (Kotsopoulos et al. 2015), as well as to other types of direct instruction. Perhaps because play is a broad concept, one that represents various types of activities regardless of their benefits for academic learning, the breadth of play in the academic learning process is less likely to be

captured in experimental studies. To do so, researchers would have to include a range of play activities and learning outcomes to show the effects of play.

A recent review of the impact of play on child development revealed that qualitative and quasi-experimental approaches proved the most frequently used methods in play research (Lai et al. 2018) and suggested that future studies should consider different approaches to provide wide scientific evidence of the impact of play. Weisberg, Hirsh-Pasek, and Golinkoff (2013) also called for a more holistic approach to the study of play and learning, moving away from traditional empirical approaches to different statistical methods that can embrace the full variety and complexity of play. Some scholars have also consistently criticized the small sample sizes in play research (Lillard et al. 2013), and we do indeed need studies with larger samples.

The study described in this article aims to fill the gaps in the current literature about play and learning research by including various aspects of play practice (play materials, home play, variety of play), by examining the relationship between play and learning in home contexts instead simply of clinical and school contexts, by using a large sample size of low-income families and by including the mental health status of care givers. This study took a different approach to understanding the relationship between play and learning by focusing on home learning practices rather than on outcomes, as other studies have explored. We sought to understand how play relates to learning practices that are linked with future learning outcomes. For example, if play influences language-learning practice, we can hypothesize it might in turn influence language outcomes.

Family systems theory constitutes our theoretical framework. This theory of human behavior defines the family unit as a complex social system in which members interact to influence each other's behavior (Kerr and Bowen 1988). The family systems theory (Broderick 1993; Cox and Paley 1997) posits that family members influence each other in predictable and recurring ways and that individuals must be understood in the context of the family (Smith and Hamon 2012). The theory has been used in a variety of areas such as psychotherapy, family therapy, and health care. In this study, we investigated activities and interactions that take place within families. By examining care giver and child interactions at home, we could identify recurring home play and learning practices that predict a child's later learning and development. Family systems theory considers both communication and interaction patterns and adaptation in context. By focusing on family behaviors and activities instead of individual behaviors, we could better understand the relationship between home play and learning practice among low-income families and whether the mental health sta-

tus of care givers relates to this relationship between play and learning practice.

Parent-Child Interactions

Parent-child interactions are a fundamental part of a young child's development. From the tone and frequency of each word a parent speaks to the experiences and feelings parents have with their children, each interaction makes an impression that can last a lifetime. Positive parent-child interactions and practices include, but are not limited to, sensitive responses to child cues, praising the child, singing, frequent child-led playtime, coloring, playing counting and rhyming games, going on family outings, shared book reading, and family mealtimes. Play provides a major context for positive interaction during the early years. Positive interactions can have a profound effect on the social and emotional development of young children and can reduce or prevent behavior issues in children and contribute to better self-regulation when they start elementary school (Bardack, Herbers, and Obradović 2017; Reedtz, Handegård, and Mørch, 2011). In children who have adverse childhood experiences (ACEs), positive parenting serves as protection against social and emotional challenges and risks of developmental delay (Yamaoka and Bard 2019). Positive parenting, especially home learning, also helps children whose mothers experience postpartum depression (Giallo et al. 2018). Increased literacy and knowledge of math among young children are also associated with positive parenting (Van Voorhis et al. 2013). Furthermore, parents report that positive parenting can even reduce their stress and increase their self-efficacy (Cooley et al. 2014; Reedtz, Handegård, and Mørch 2011).

Parents who view themselves as effective are more likely to engage with their children at home, which in turn is associated with higher levels in their children's academic performances (Coleman and Karraker 1997; Hoover-Dempsey, Bassler, and Brissie 1992). As a result, the engagement of parents with their children at home is an important aspect of positive parenting. In particular, numerous studies have linked language and literacy activities, as well as math activities, at home for children ages three to eight years old to higher academic achievement in literacy and math as well as positive social and emotional outcomes (Van Voorhis et al. 2013). For example, meta-analysis of home-based literacy interventions in early childhood including home tutoring, listening to children read, dialogic reading, and shared book reading, have been associated

with later gains in standardized literacy testing and vocabulary skills. Further, an enriched home-learning environment that includes a variety of activities and experiences has been associated positively with preschooler vocabulary and letter identification (Chazan-Cohen et al. 2009) and better outcomes in reading, math, and self-regulation (Melhuish 2010). Further, intervention studies of in-home activities for low-income families that support math in preschool-aged children have associated cooking, board games, and the use of at-home math materials with higher posttest math skills (Van Voorhis et al. 2013).

Negative parent-child interactions and harsh parenting can have a detrimental impact on children (Chang et al. 2003; Mackenbach et al. 2014). However, even when interactions are not negative, but there is simply a lack of positive interactions, the effects on children can still be damaging. Lack of positive parenting interactions and practices increases the risk of developmental delay in children from low-income families (Shah et al. 2015). Infants who have less verbal interaction with their parents by age three have significantly reduced language development, vocabulary, and reading comprehension in elementary school (Hart and Risley 2003). A lack of positive parent-child interactions can also weaken the parent-child relationship and affect the child's ability to bond with others in the future (Bowlby 1988).

Further, poor parental mental health is considered both an ACE as well as a by-product of adverse experiences in adults associated with intergenerational continuity of trauma when combined with poverty (Bouvette-Turcot et al. 2017; Bouvette-Turcot et al. 2019). Other findings indicate that positive parenting moderates the effects of ACEs on social, emotional, and general development skills but that a complete absence of positive parenting equals the effect of four ACEs on such social and emotional skills and increases the likelihood of developmental delays (Yamoka and Bard 2019). Clearly, positive parent-child interactions play a vital role in the development of children.

Play and Early Learning

Extensive research suggests the positive effects of play on child development. More specifically, research demonstrates a relationship between play and literacy (Rand and Morrow 2021). Studies of literacy-related play indicate that emergent literacy skills among young children can be promoted in a play setting (Saracho and Spodek 2006) in different cultures, although attitudes about play as a vehicle

for learning vary (Roopnarine, Yilirim, and Davidson 2019). For example, Han and her colleagues (2010) examined the effect of an explicit instruction vocabulary protocol (EIVP) in the context of guided play and noted a difference in expressive language scores and steeper receptive-vocabulary growth trajectories for children who were exposed to EIVP plus play compared to the children exposed only to EIVP. Further, play is a natural context in which children can explore new ways to merge language and thought (Pelletier 2011) and to practice reading and writing skills that foster the literacy necessary for formal reading (Saracho and Spodek 2006).

Research (Hassinger-Das 2018; Toub et al. 2018) also suggests that children learn early math skills through playful learning in the context of guided play (play with adult scaffolding) and free play (child-initiated, child-directed play). Early math skills, defined as a collection of basic concepts such as counting, quantity, shapes, spatial relations, measurement, and patterns (Harris and Petersen 2019) are a strong predictor of future success in reading and math (Duncan et al. 2007). Emfinger (2009) identified the mathematical behaviors present in dramatic and pretend play (role play pretending to be different roles) to include one-to-one correspondence, counting, adding, subtracting, and representing numbers by written and spoken signs and symbols. These findings suggest dramatic play facilitates numerate skills and offers a valid context for the establishment of numerate behaviors. In a randomized controlled trial, greater gains in math skills—such as numeracy, shape recognition, and mathematical language—were noted among children who engaged in semistructured block play in a treatment group to enhance math learning compared to the control group (Schmitt et al. 2018). On the other hand, Elliot and Bachman (2018) suggest that numeracy may be best promoted through more formal than informal math activities with children at home. The researchers further suggest the effectiveness of formal versus informal activities may also be related to the level of maturation of the children, the autonomy allowed them in numeracy activity, and the level of intentionality and comfort with numeracy among the parents.

A recent review of guided play and learning suggests that guided play has a greater positive effect than direct instruction on early math and language skills (Skene et al. 2022). This meta-analysis of thirty-nine intervention studies shows specifically that guided play had a greater positive effect than direct instruction on early math, shape knowledge, and task switching and that free play had a greater positive effect on spatial vocabulary. Some researchers consider the existing evidence about pretend play and other developmental considerations

such as social skills, problem solving, and creativity too questionable and insufficient to draw conclusions. Lillard and her colleagues reviewed the literature linking pretend play and developmental benefits and concluded that pretend play scholarship is problematic. They cited experimenter bias, very small sample size, difficulty to replicate, nonrandom assignment, confounding of implementor with intervention, and unsound statistical practices (e.g., one-tailed tests without prior rationale). They concluded that conducting an experimental study of pretend play and measuring its effect on learning outcomes is a difficult task, making causality between play and learning elusive (Lillard et al. 2013).

Although these findings make it difficult to draw a direct line between pretend play and developmental benefits, other forms of play such as guided play have been shown to increase oral language development and word learning (Hadley and Dickinson 2019; Han et al. 2010). Play studies about fostering vocabulary development among low-income children have focused on shared book reading as a strategy for merging play and oral language development to increase vocabulary acquisition and build language. For instance, in two intervention studies by Toub and her associates (Toub et al. 2018) that explored the role of play following shared book reading in increasing vocabulary among low-income preschoolers, the researchers found that adult-supported, play-based activities were more effective than direct instruction.

Parenting and Mental Health

Mental health challenges such as depression, anxiety, and hostility can occur in low-income families. Given the psychological tensions often related to poverty, struggles with mental health may increase the difficulty parents face in engaging with their children and even dampen their emotional responses to them. The impacts of parental mental health on child outcomes are mixed. Children may face greater cognitive, emotional, and behavioral consequences (Yamamoto and Keogh 2018). In addition, parents who have high anxiety can often display hostility. Parents who are hostile may exhibit negative feelings toward their children and easily become irritated. Such parents often grow agitated during these stressful interactions with their children. Consistent with predictions from family systems theory, these behaviors may have negative effects on the parent-child relationship and may impact the home environment negatively (Newland, Ciciolla, and Crinic 2015; Osyerman et al. 2005).

Although mental health issues such as depression and stress may lead to fewer positive parenting behaviors, negative outcomes are not a certainty. Parent self-efficacy, especially related to discipline, play, and nurture, has been found to be a moderator that affects the strength or direction of these relationships (Meunier and Roskam 2008; Baron and Kenny 1986). Parent self-efficacy has been found to moderate the negative impact of depression on parent-child engagement in the home among families of children fifteen to thirty-six months of age (Peacock-Chambers et al. 2016). A parent's sense of outcome and self-efficacy has also been found to correlate positively with higher social competence, lower internalizing behavior, and lower externalizing behavior among children three to seven years old.

Mothers experiencing depression can demonstrate resilience in how they engage with their children at home (Giallo et al. 2018). When mothers maintain a high level of engagement and interaction with their children, the children are more likely to experience better outcomes. Reading stories, playing together, talking about experiences, and involving children in everyday routines can provide mothers and children with an opportunity to share positive times with one another as well as promote a warm and responsive relationship. For mothers, educational attainment and partner support can strengthen their involvement with home learning. Education can also create access to more social resources for depressed mothers, and partner support can reduce the magnitude of the task of child rearing.

Current Study

To fill the gaps in the literature, our study examined how play relates to learning practices such as home reading and home teaching activities among low-income families. We also examined the relationship of care giver mental health status to the links between play and learning. We used three research questions: What is the relationship between play and home reading practices among low-income families? What is the relationship between play and home teaching practices among low-income families? And what is the relationship between play and learning practices (measured by reading and teaching practices at home) among care givers with and without mental health concerns?

Method

Data and Measures

Our study used a large database from the infant and toddler version of the Family Map Inventory (FMI). FMI consists of comprehensive, research-based screening interviews by early childhood educators of parents (Whiteside-Mansell et al. 2007). The interviews take approximately one hour and are typically conducted at the family home. Trained family service program staff use an FMI interview to identify family needs and to set relevant goals to support a home that is enriched, safe, and nurturing. FMI has been widely used in home-visiting and center-based programs serving children up to five years old and their families in several states across the United States.

Program service providers rather than researchers collect data from FMI. Thus, our analyses rely on administrative data. All FMI interview results are stored in a secure electronic online portal accessible only by FMI staff (fmportal.cafesarkansas.com). One of the authors of this study, Leanne Whiteside-Mansell, is an FMI developer and researcher, and another, Rubie Eubanks, is a researcher employed by FMI. They conducted the analyses but were not involved in data collection. The rest of the authors are researchers working with the Early Head Start Program using FMI.

This study used two domains of FMI relevant to our research questions: “early learning” and “care giver mental health.” The early learning domain includes subdomains such as “play materials,” “parent-child play,” “reading to child,” “teaching child,” and “variety of experience.” The care giver mental health domain includes “parental stress,” “care giver depression,” “hostility,” and “anxiety.” The developers of FMI have published acceptable evidence of reliability and validity (Whiteside-Mansell et al. 2010; Whiteside-Mansell et al. 2013). With the infant toddler version of FMI, Whiteside-Mansell and her associates (Whiteside-Mansell et al. 2013) report internal consistency reliability for domains where there are enough questions to do so. (For early learning, $\alpha = 0.69-0.80$). They also report validity of the infant toddler FMI based on prior work with the early childhood FMI (Whiteside-Mansell et al. 2007; Whiteside-Mansell et al. 2010) as well as the additional assessments of some constructs. For early learning, identification rates appear similar to published estimates. For care giver mental health, responses to each set of interview questions correlate significantly with results from data from the national Head Start Family and Child Experiences Study (FACES) (Zill et al. 2003).

We based our summary of scale constructs on previous play and learning literature using items from the FMI. Figure 1 explains how we created the variable scales with FMI items.

For the play scale, we used three subscales related to play: play materials, home play, and variety play. The play materials scale was an assessment of the availability of materials for play in the home—four items scored on a four-point scale. Play materials includes those supporting fine and gross motor skills—visual, tactile, creative, and auditory. An example might include: “Do you have things that your baby is able to feel and cuddle such as stuffed animal, soft cloth, or play mat with textures?” The home play scale provides an assessment of the availability of the parent-child play interaction at home. The three items focus on the play activities that occurred the prior week and were scored on a four-point scale. An example might include: “In the past week, how many times did you or someone in your family, play chase or dancing games with the child?” The variety play scale assessed the various play events parents arrange away from home for their children. These target monthly play events (e.g., going to a local park, shopping, visiting a friend or relative) and yearly events (e.g., visit a zoo, an aquarium, or a museum, or attend community events) with a simple yes or no response option.

We composed the reading scale of four items. For example, one item assessed the number of times a week that the mother-figure, father-figure, or another adult read to a child. The scale ranged from none to six or more times a week scored on a four-point scale. Another item assessed the number of children’s books available to a child, in which responses ranged from none to ten or more on a four-point scale.

The teaching scale assessed the extent that parents or others in the home actively taught a child academic skills. The six items focused on the last week and were scored on a four-point scale from none to six or more times. An example might include: “In the past week, how many times did you or someone in your family count things with your child; point out letters or words; point out and name colors; or point out and name shapes?”

The care giver mental health scale consisted of screening items for depression (two items), anxiety (three items), and hostility (two items). All items were scored from “not at all” to “nearly every day” on a four-point scale. The depression items came from the patient health questionnaire-2 (PHQ2) in Kroenke, Spitzer, and Williams (2003). We constructed the hostility and anxiety items using a similar format. Examples include: “In the past 2 weeks, how often have

Variable Scale		Number of Items	Constructs in Scale
<i>Play</i>	<i>Play Materials</i>	4	Play materials at home: Mirror in the crib, mobile, toys making noise, stuffed animal, soft cloth, play mat, ball, crib gym, building toys, art materials, musical toys
	<i>Home Play</i>	3	Parent-child playing at home: Playing games such as peek-a-boo, patty cake, chasing, dancing, playing with toys or games with child
	<i>Variety Play</i>	7	Play outside home: Outings such as shopping, going for a walk to a park, visiting friend, going to a play, concert, live show, zoo, aquarium, gallery, museum, community events like a fair, festival, parade, block party
<i>Home Reading</i>		4	Home reading practice: Number of books, frequency of reading, reading partner
<i>Home Teaching</i>		6	Home teaching practice: Counting, singing alphabet song, teaching letters or words, colors, shapes
<i>Care Giver Mental Health</i>		7	Maternal depression, anxiety, hostility

Figure 1. Variable Scale Creation and Explanation

you been bothered by feeling down, depressed, or hopeless; bothered by having little interest or pleasure in doing things; bothered by feeling suddenly scared for no reason; or bothered by feeling tense or nervous?”

Sample

The sample for this study includes child and parent-care giver dyads in the Family Map Inventory database. We extracted data from the electronic Family Map portal. Our study targeted children up to thirty-six months old using the infant-toddler version of the FMI database. From the larger database, we restricted our analyses to FMI interviews of parents of infants or toddlers conducted between July and December 2019 (N=1,107), so that all the data we collected came from

interviews prior to the COVID-19 pandemic. We excluded repeat interviews for the same child (N=31, keeping the earliest interview), interviews that omitted the questions related to all of the play scales (N=23), and interviews of a second child in the home (N=157).

We describe the resulting analytic sample (N=896) for this study in figure 2. The data consists of families from five states: Arkansas (39.5 percent), Arizona (30.2 percent), Texas (13.6 percent), Delaware (12.3 percent), and Maryland (3.9 percent). Families were enrolled mostly in Early Head Start or Head Start programs (69.2 percent), Arkansas home visiting programs (26.6 percent), Arkansas funded state programs (2.8 percent), and other Arkansas center-based programs (1.5 percent). As a result, families in the study are participants in federal and state programs targeting families in poverty with young children.

Most children in our sample were White (47.3 percent) or Black (28.8 percent), but a smaller proportion of children identified as other races (5.0 percent), multiple races (4.7 percent), American Indian (1.3 percent), Asian (1.0 percent), or Native Hawaiian/Pacific Islander (0.7 percent). For 11.2 percent of the children, we did not know their race. We gathered data on children's ethnicity separately from the data on race. Our ethnicity data show that nearly half of the children (46.6 percent) were Hispanic or Latino. There were slightly more female children (57.1 percent) than male (42.9 percent). Children's ages ranged up to thirty-six months (M=19.56, SD=9.6 months). Nearly all respondents in the interviews were biological parents (91.5%; mothers, N=784 or fathers, N=36) with other respondents including foster parents (N=17), adoptive parents (N=7), grandparents (N=13), or other care givers (N=7). Spanish was spoken in the homes of many children (N=35.6 percent), and even more respondents considered their family to be Hispanic or Latino (46.6 percent). About one-fifth of the respondents (21.2 percent) did not have a high school diploma. Respondent ages ranged from fourteen to seventy-six years (M=29.5, SD=7.8 years). And many respondents worked full or part-time (twenty to sixty hours, 49.0 percent; not working, 41.7 percent; one to twenty hours, 9.3 percent). Most families included children in addition to the target child for FMI responses (73.6 percent) and other adults (73.0 percent).

Analysis

We conducted all analyses using IBM SPSS Statistics 28, statistical software

Factor	<i>N</i> (896)	%
Child Demographics		
Gender		
Female	512	57.1
Male	384	42.9
Race		
White	424	47.3
American Indian	12	1.3
Asian	9	1.0
Black	258	28.8
Native Hawaiian/Pacific	6	0.7
Other	45	5.0
Multiple	42	4.7
Unknown	100	11.2
Age in months (<i>M, SD, range</i>)	(19.6, 9.6, 0-36)	
Primary Care Giver Demographics		
Gender		
Female	857	95.6
Male	39	4.4
Relationship to child		
Biological parent	820	91.5
Foster parent	17	1.9
Adoptive parent	7	0.8
Grandparent	13	1.5
Other or unknown	39	4.3
Language status		
English	534	59.6
Spanish	319	35.6
Other	36	4.0
Unknown	7	0.8
Level of education		
No high school diploma	190	21.2
GED	40	4.5
High school diploma	310	34.6
Technical certificate or license	93	10.4
AA, AS, or some college	149	16.6
College degree	99	11.0
Unknown	15	1.7
Care giver Mental Health		
No concern	546	60.9
Concern	329	36.7
Unknown	21	2.3

Figure 2. Demographic Information for Sample

widely used for research and business. We began by carrying out two multiple regressions to investigate whether the play scales (play materials, home play, variety play) could significantly predict the home reading or home teaching scales. We examined four additional multiple regressions to investigate the disruption of care giver mental health on the links between play and home reading or home teaching. We used care giver mental health scores to create two groups of families: one with care giver mental health concerns and one with no care giver mental health symptoms. Care givers with concerns reported at least one symptom occurring at least “several days” on the two items of the screening. Finally, to test the strength of the regression coefficient across groups in the last four ordinary least square regression models, we tested the interactions of care giver mental health status with the three play scales in separate regression analyses. In these models, we created interaction terms as the product of mental health scale and the individual play scale. Models included controls for all three play scales.

Results

What is the Relationship between Play and Home Reading Practice among Low-Income Families?

Figure 3 reports results from the regression analysis of the relationship between play and home reading. For reading at home, the overall regression model was significant. The results of the regression model indicated that all three play scales (play materials, home play, variety play) were significant predictors of home reading $F(3,823) = 93.49, p < .001$. All independent factors contributed significantly to home reading. Among the three play scales, variety play ($B = .638, p < .001$) was the strongest predictor of home reading.

What is the Relationship between Play and Home Teaching Practice among Low-Income Families?

Figure 3 also reports results from the regression analysis of the relationship between play and home teaching. For home teaching, the overall model was significant. The results of the regression model indicated that all three play scales (play materials, home play, variety play) were significant predictors of home teaching, $F(3,843) = 344.24, p < .001$. All independent factors contributed significantly to teaching practices at home. Among the three play scales, the variety

Variable	Home Reading				Home Teaching			
	<i>B</i>	<i>SE B</i>	β	<i>t</i>	<i>B</i>	<i>SE B</i>	β	<i>t</i>
Constant	.310	.092		3.39***	-.041	.076		-.537
Play Materials	.222	.032	.229	6.99***	.165	.027	.156	6.21***
Home Play	.211	.032	.219	6.62***	.589	.026	.567	22.30***
Variety Play	.638	.083	.244	7.68***	.634	.069	.224	9.20***
<i>R</i> ² =0.254, <i>Adj. R</i> ² =0.251, (N=826) <i>R</i> ² =0.551, <i>Adj R</i> ² = 0.549, (N=846)								
***= p<.001								

Figure 3. Regression Analysis of the Relationships between Play and Reading and Teaching Practice

of play ($B=.634, p < .001$) and home play ($B=.589, p < .001$) were the strongest predictors of home teaching.

What Is the Relationship between Play and Learning Practice (Measured by Reading and Teaching Practice at Home) among Care Givers with and without Mental Health Concerns?

Figure 4 shows the regression analysis of the relationship between play and reading or teaching practices at home while considering the mental health status of care givers (“mental health concern group” versus “no mental health concern group”). The results of the regression model for the no mental health concern group indicated that all play scales were significant predictors of home reading ($F(3,511) = 54.71, p < .001$) and home teaching ($F(3,519) = 192.13, p < .001$). All independent factors contributed significantly to reading and teaching practices in the no mental health concern group.

The regression model for the mental health concern group found similar patterns. All play scales proved significant predictors of reading at home ($F(3,294) = 37.18, p < .001$) and teaching at home ($F(3,304) = 147.42, p < .001$). All independent factors contributed significantly to reading and teaching practices in the mental health concern group.

In both groups of families, those with and without mental health concerns, an examination of the standardized betas indicates that the predictive power

Variable	Home Reading				Home Teaching			
	<i>B</i>	SE <i>B</i>	β	<i>t</i>	<i>B</i>	SE <i>B</i>	β	<i>t</i>
Care Giver Mental health	No-Concern group				No-Concern group			
Constant	.346	.120		2.88	-.057	.100		-.572
Play Materials	.177	.039	.190	4.52***	.167	.033	.168	5.08***
Home Play	.232	.043	.228	5.41***	.588	.036	.544	16.4***
Variety Play	.706	.103	.273	6.86***	.655	.086	.238	7.59***
	R ² =0.253, Adj. R ² =0.239, (N=514)				R ² =0.526, Adj. R ² =0.523, (N=522)			
Care Giver Mental health	Concern group				Concern group			
Constant	.216	.147		1.47	-.018	.123		-.148
Play Materials	.296	.056	.290	5.32***	.155	.046	.133	3.34***
Home Play	.199	.049	.228	4.06***	.591	.041	.601	14.6***
Variety Play	.463	.148	.171	3.13***	.630	.121	.209	5.20***
	R ² =0.275, Adj. R ² =0.268, (N=297)				R ² =0.593, Adj. R ² =0.589, (N=307)			

*** $p < 0.01$

Figure 4. Regression Analysis of the Relationship between Play and Reading and Teaching Practices among Care Givers with and without Mental Health Concerns

of a variety of play was strongest among other play scales for both reading and teaching.

We also examined the potential difference in the main effects of the play scales on reading and teaching practices when the care giver exhibited mental health symptoms. In an examination of the play scales and the interaction of each play scale controlling for the three main effects, we found that none of the interactions was significant. This result suggests that the play scales function similarly across families regardless of mental health status. The pattern of the relationship between play and learning were similar in both groups of families with and without the mental health concern. Although it is not our research question, our preliminary analysis examined the group differences and found that there was no statistical difference in play materials and home play, but there

was a statistical difference in the variety of play ($t=.392, p<.001$). This calls for a more in-depth future study.

Discussion

In response to recommendations from researchers (e.g., Lai et al. 2018; Lillard et al. 2013; Weisberg et al. 2013) calling for more nuanced analyses employing larger sample sizes for play research, our study promotes understanding of the relation between several components of play and children's early learning. With rich and large data from the infant-toddler Family Map Inventory gathered from numerous U.S. sites at a single point in time, we were able to examine how play relates to the process of learning, home reading practices, and care givers' teaching practices for their children and found stronger relationships compared to previous studies.

Our study revealed that matters related to play such as play materials and toys, play between parents and children at home, and the variety of play away from home significantly predicted home learning practices such as reading and teaching. In general, care givers who support children's play are likely to support their young children's learning as well. First, when examining relationships between play and care givers' reading practices, we found that all three play scales—play materials, home play, and variety play—predicted home reading practices among low-income families. Next, when examining relationships between play and home teaching, we once again found that each of the three play scales predicted home teaching. Finally, when studying how these relationships might vary based on care givers' mental health issues, our regression models for both no-concern and mental health concern groups successfully predicted home reading and home teaching based on the three play scales. However, interaction tests showed no differences in the care giver's mental health status and how the play scales function.

It was interesting to find that the variety of play was the strongest predictor of home reading and teaching practices by care givers. Care givers who provide their children more play opportunities outside the home read books more frequently and taught basic academic skills at home. Previous literature on play and learning did not distinguish between home practices and the variety of play away from home. Fortunately, we were able to examine this distinction in types of play, due to the in-depth, nuanced, and personal level of FMI data. These patterns were similar among care givers with and without mental health concerns. This implies that play could make important contributions to the resilience of young

children experiencing risk, if incorporated into early intervention approaches.

Given that some risk factors are hard to change, early intervention programs focusing on play might offer efficient ways to boost the resiliency of the family. Early Head Start and home-visiting programs, which already focus on interactions between care givers and children in low-income families, are highly relevant contexts in which an expanded emphasis on play may be a valuable addition to existing services. Further, the predictive power of the FMI play scales indicates that the FMI can be a valuable tool in informing service delivery in these types of early intervention settings.

While the FMI is a promising measurement tool that can help both practitioners and researchers understand how play relates to care giver learning practices, our approach has limitations that could be addressed in future research. First, the FMI relies upon self-report data from care givers. Although FMI developers train early childhood staff on the use of the FMI at each site, care givers may not be consistently accurate in responding to the interview questions. Also, our data are cross-sectional. Although the FMI database would allow for longitudinal comparisons, our ability to conduct such analyses was constrained by the pandemic, because it is likely that families' home behaviors (and the ability to engage in activities outside the home) would have been impacted after our initial fall 2019 data collection point. Future researchers should be able to examine how children's play experiences develop over time and how this relates to home teaching and reading. Early childhood programs in different locations offer another challenge to employing multisite datasets of this type because such programs have different emphases. Although the purpose of our study was not to examine these program-level differences, future analysis could potentially incorporate them.

Another future study should examine in depth play and home learning among those concerned with mental health compared to those not concerned. Although not addressed in our research, our preliminary analysis showed that there were statistical differences in the variety of play between the group concerned with mental health issues and the group that was not so concerned. This has prompted researchers to seek further examination in a future study.

Our study provides new insight that care givers who play with children are more likely to support home reading and academic learning. Care givers who understand the importance of play and support play at home are more likely to support age appropriate learning. Play interaction with their children could provide the background knowledge and experiences necessary to engage in

later academic learning at school. Finally, our study helps identify opportunities and content areas for care givers to interact with their children to support their learning and, potentially, for early childhood programs to help support care givers doing so.

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