

Table 1. Literature Review of Influence of Language Nutrition on Children’s Cognitive and Language Outcomes

Author, year	Objective	Design	Sample	Assessment of Language Nutrition	Outcome Measures	Results
Adi-Japha & Klein, 2009	Examine association between school readiness, parenting quality, and amount of time spent in childcare	Prospective cohort	<i>N</i> = 1364 1 month old to 3 years old Data from <i>NICHD Study of Early Child Care and Youth Development</i>	Videotaped semi-structured play at home- 6 and 15 months Videotaped semi-structured play in laboratory- 24 and 36 months Visits to childcare settings at 6, 15, 24, and 36 months HOME- 6, 15, 36 months	Bracken Basic Concepts Scale Reynell Developmental Language Scales	Associations for school readiness and receptive language were stronger among children who experienced medium amounts of childcare than those who experienced high amounts of childcare. These associations were not weaker than those who experienced primarily maternal care.
Ambrose et al. 2014	Examine quantity of adult talk, adult child conversations in the environment of toddlers hard of hearing and if factors contribute to variability in communication outcomes	Prospective cohort	<i>N</i> = 28 12-36 month olds with bilateral hearing loss	LENA recorders-18 months	Mullen Scales of Early Learning-2 years Comprehensive Assessment of Spoken Language—3years	More conversational turns were associated with better communication outcomes. Relationship between Mullen Scales of Early Learning scores and media exposure was mediated by conversational turns.

						For every 1% increase in media, conversational turns decreased by 2.44%.
Arevalo et al., 2014	Examine if parenting behaviors and practices in Mexican American families in years 0-3 predict children's academic performance.	Prospective cohort	$N = 36$	HOME Parent Behavior Checklist Nursing Child Assessment Teaching Scale Tested yearly	Bayley Scales of Infant Development II-yearly Illinois Standards Achievement Test-3 rd grade	There was a significant correlation between parental developmental expectations, nurturing behaviors, discipline, and academic performance ($p < .05$). Discipline strategies and developmental expectations predicted 30% of the variance Illinois Standards Achievement Test.
Bornstein et al., 1998	Examine sources of individual variation in child vocabulary competence in context of multiple variables	Cross-sectional	$N = 131$ 20 months	Two hour audiotaped interactions (language input and child's language)	Reynell Developmental Language Scales Early Language Inventory Knowledge of Infant	Maternal words and MLU related to verbal comprehension on Reynell Developmental Language Scales and Early Language Inventory. Maternal knowledge of child development

					Development Inventory	related to child's language outcomes.
Brent & Siskind, 2001	Determine if exposure to isolated instances of a word predicted later knowledge of the word	Prospective cohort	$N = 13$ 9 month olds	Audiotape- every 2 weeks between 9-15 months, assessed frequency and diversity of words	MCDI- 18 months	Frequency of word used predicted knowledge of words on the MCDI
Bronte-Tinkew, et al. 2008	Examine if paternal involvement is associated with infant cognitive outcomes	Retrospective cohort	$N = 6270$ 8-11 months with a resident father	Data used from <i>Early Childhood Longitudinal Study-Birth Cohort</i>	BSID	Cognitively stimulating activities by fathers reduced likelihood of poor cognitive outcome. Father involvement reduced odds of negative babbling outcome by 7%.
Burchinal, Vernon-Feagans, & Cox, 2008	Determine the extent to which exposure to social risk is related to parenting and cognitive development in first 15 months of life	Prospective cohort	$N = 1292$ one-month olds in geographic area of poverty	HOME inventory Free play interactions (maternal engagement, harsh parenting) Book-reading session (variety of maternal	BSID-15 months MCDI	Maternal language input at 6 months mediated the association between social risks and Bayley scores. HOME inventory and level of maternal engagement predicted Bayley scores.

				language/language input) Assess at 1, 6, and 15 months		
Buschmann et al., 2009	Evaluate the effectiveness of a parent based language intervention program on 2 year old with language delays	Randomized control trial	<i>N</i> = 61 average of 24 months, with specific expressive language delays	3 month Heidelbergy Parent- based Language Intervention program, no intervention for waiting group	MCDI (German Version) Bayley Scales of Infant Development	75% of the intervention group displayed normal expressive language ability at age 3 compared to 44% in the control group.
Camp, Cunningham, Bernman, 2010	Examine the relationship between the cognitive environment at 10-18 months and vocabulary at 18-30 months	Prospective cohort	<i>N</i> = 157 10-18 month olds	StimQ- 10-18 months and 6-19 months after initial assessment	MCDI- 6-19 months after initial assessment	Children with low parental verbal responsivity at baseline were four times more likely to have a vocabulary score in the lowest quartile for the MCDI 6-18 months after baseline.
Caskey, Stephens, Tucker & Vohr, 2014	Test association of mean adult word counts at 32 and 36 weeks postmenstrual age in the NICU with	Prospective cohort	<i>N</i> = 26 Preterm infants with birth weight <1250g	16 hours of LENA digital language recorders- 32 and 36 weeks corrected gestational age	Bayley Scales of Infant Development- 7 and 18 months	At 32 weeks, adult word counts accounted for 12% of variance in language scores at 18%. At 36 weeks, adult word count accounted for 26% of variance in

	cognitive and language scores					cognitive scores at 18 months. Every increase of 100 adult words per hour during the 32 week recording was associated with a two point increase in language and 0.5 point increase in the expressive communication score at 18 months.
Cates et al., 2012	Explore the relationship between the cognitive stimulation in home, six month infant communication, and 24 month toddler language	Prospective cohort	<i>N</i> = 320 six-months old, low SES	StimQ –six months old	Communication and Symbolic Behavior Scale Short Temperament Scale Preschool Language Scale— at 24 months	Higher scores on the StimQ were positively associated with Preschool Language Scale scores, and this relationship was mediated by six-month infant communication.
Cline et al., 2013	Understand how parent-child book-reading quality— instructional and emotional— interact and relate to learning in a	Cross-sectional	<i>N</i> = 81, mean age of 13 months, in Early Head Start programs in rural Midwest, English	Videotaped parent-child interactions Parent/Caregiver Involvement Scale	BSID Preschool Language Scale	Higher amounts of extra-textual talk and parent involvement scale predicted child cognitive and language scores. The use of higher extra-

	sample of low-income infants and toddlers		and Spanish home languages			textual talk during book reading was related to child learning, depending on the emotional quality of book reading.
Cronan et al., 1999	Evaluate the effect of Project PRIMER	Randomized control trial	<i>N</i> = 225 1-3 year olds	Split parents into groups—0, 3, or 18 instructional visits— instructional visits taught low-income parents techniques to promote literacy	MCDI- 1-2 years old Bracken Basic Concept Scale- 3 years old	Parents in the high-dose intervention program increased reading to child, asked more questions during reading, taught more concepts to the child, and increased their library use. Children in these groups had higher language comprehension scores, vocabulary, and language complexity. Language comprehension correlated with parental reading behaviors.
Cruz et al., 2013	Identify strategies for promoting language in	Prospective cohort	<i>N</i> = 96 <24 months, deaf children with cochlear	Free play session (facilitative language techniques, such as	Reynell Developmental Language Scales	Parallel talk, open-ended questions, expansions, and recasts all resulted in

	children with cochlear implants		implants, followed for 3 years after implantation	imitation, parallel talk, linguistic mapping, open-ended questions) Art gallery task (parental sensitivity)		higher language scores. Linguistic mapping, imitation, labels, directives, and close-ended questions were not associated with language scores.
Deckner et al., 2006	Determine the effects of home literacy practices and mother's utterances during reading on children's language development	Prospective cohort	<i>N</i> = 55 18-42 month olds	Videotaped reading sessions- 27 months Stony Brook Family Reading Survey- 27 months	Mullen Scales of Early Learning-18 months PPVT and Expressive Vocabulary Test- 30 and 42 months	Home literacy practices were moderately associated with expressive and receptive language at 30 and 42 months. Home literacy practices accounted for 9% of variance in expressive language development at 30 months after controlling for initial differences in language ability.
Dodici et al., 2003	Examine relationships between parent-child interaction and early literacy skills	Prospective cohort	<i>N</i> = 27	Videotaped parent-child interaction (structured sessions to elicit teaching and play) at 14, 24, and 36 months	Parent-Infant/Toddler Interaction Coding System (PICS)	There was a statistically significant correlation between PPVT and 24 and 36 month PICS scores. The quality of parent-

					<p>Stony Brook Family Reading Survey</p> <p>MCDI- 24 months</p> <p>PPVT- 54 months</p> <p>Woodcock Johnson Tests of Achievement- 54 months</p> <p>Test of Language Development- 54 months</p>	<p>child interactions at early ages is related to early literacy skills of receptive vocabulary, symbolic representation, and phonemic analysis.</p>
Dunphy-Lelii et al., 2014	Assess relationship between social-cognitive looking-time paradigms and caregiver-infant interactions	Cross sectional	<i>N</i> = 75 10-12 month olds	<p>Structured play session with caregiver</p> <p>Free play session with caregiver</p>	Look-while-listening task	Caregiver and infant interaction quality, maternal supportiveness, caregiver and infant joint engagement skill correlated with faster habituation to looking-time displays. It predicted infant attention to a goal-directed action.

Duursma, Pan, & Raikes, 2008	Examine the effects of father book reading	Prospective cohort	<p><i>N</i> = 639 at 24 months</p> <p><i>N</i> = 577 at 36 months</p>	Parental interview	<p>BSID- 24 and 36 months</p> <p>MCDI-14 and 24 months</p> <p>PPVT- 36 months</p>	There was no effect of book reading at 24 months to the PPVT at 36 months. When the interaction term between father education and book reading was added, an effect was seen. Book reading only predicted outcome for fathers with at least a high school education.
Fagan et al., 2011	Examine mediators of the association between stable non-residence and child outcomes	Matched case-control study	<p><i>N</i> = 200</p> <p>24 month olds</p> <p>Early Childhood Longitudinal Survey Birth Cohort</p> <p>Matched nonresident to coresident cases on mother's race/ethnicity, household income, and status as an</p>	<p>Two Bags Task (parental sensitivity, intrusiveness, stimulation of cognitive development, positive regard, negative regard, detachment) at 24 months</p> <p>Questionnaire about quantity of interactions at 24 months</p>	BSID—24 months	The relationship between stable nonresidence and child outcomes was partially mediated by the quality of mother's supportiveness. The quantity of mother's interactions did not mediate the relationship between stable nonresidence and child outcomes.

			adolescent parent.			
Farrant & Zubrick, 2013	Examine the extent to which low levels of joint attention in infancy and parent-book reading increase the risk of children having poor vocabulary at school entry	Prospective cohort	$N = 2369$ 9 months old at start, 58 months old at end	Mailed questionnaires about book reading at nine months	Communication and Symbolic Behavior Scales PPVT Assessed at 58 months	Children who had low levels of shared book reading at nine months were 2.5 times more likely to have poor vocabulary at 58 months. Children with low joint attention had poorer vocabulary. 25% of children with low parent book-reading scored low in vocabulary, compared to 8% of children with high parent book-reading.
Fish & Pinkerman, 2003	Compare rural Appalachian children with normative populations on measures of language and determine what variables predict preschool assessments	Prospective cohort	$N = 85$ Four and nine month olds, Rural Appalachia	Maternal interaction in teaching situation at four and nine months	MCDI Preschool Language Scale 15 months, 4 years, prior to kindergarten entry	At 15 months, language skills were similar to those of normative populations, but at four years old and prior to kindergarten entry, the majority of participants had low language skills. Maternal interactions in infancy were related to preschool

						language. Maternal interaction variables accounted for 8-11% of variance in auditory comprehension and expressive language at four years of age.
Girolametto et al., 1999	Examine the relationship between variation in maternal language and language development in children with expressive vocabulary delays	Prospective cohort	<i>N</i> = 12 25-35 month olds with an expressive language delay	Two free play session- one baseline, second 4 months later after 3 hours of a parent-focused language intervention program	SICD MCDI Stanford Binet Intelligence Scale	Maternal imitation, interpretations, and expansions were correlated with the number of children's utterances, vocabulary size, and expressive language.
Girolametto et al., 2002	Examine cross-cultural variation in linguistic responsiveness to young children	Cross-sectional	<i>N</i> = 20 children with delays in expressive vocabulary, 10 Italian speaking, 10 English speaking	Free play sessions (language input and responsiveness)	Free play sessions (child language production)	Maternal responsiveness was correlated with children's language productivity.
Girolametto et al., 2007	Describe outcomes following participation in a social interactive	Prospective cohort	<i>N</i> = 3 2.8-3.2 years olds	20 minute videotaped activities (child communicative acts and parent	MCDI	Responsive comments during play interactions and responsiveness increased. Children

	model of language intervention		diagnosed with autism spectrum disorder	utterances) before and after 11 week intervention program (More than Words)	Joy and Fun Assessment	had positive outcomes in vocabulary.
Glascoe et al., 2010	Assess what parenting behaviors are associated with optimal child development	Cross-sectional	<i>N</i> = 382 0-24 month olds	Brigance Parent-Child Interaction Scale (self-report and observation versions)	Brigance Infant and Toddler Screen	The parenting behaviors predicted developmental outcomes. Risk of delay was three times greater for parents who did not do greater than two of positive behaviors.
Goldstein & Schwade, 2008	Determine the role of contingent adult speech in providing guidance to infant's pre-linguistic vocal learning	Quasi-experimental	<i>N</i> = 60 9.5 month olds	2 30-minute free play sessions Manipulated amount of contingent feedback	Free play sessions (infant's babbling)	Infants who received contingent feedback modified babbling in accordance with phonological structure present in caregiver's talk. Infants acquire phonological patterns in their mother's speech via social guidance learning.
Goodwyn et al., 2000	Evaluate the effect of symbolic gesturing on early vocabulary development	Randomized control trial	<i>N</i> = 103 11 month olds	Parents in the sign training group were instructed in ways to promote gesturing by	MCDI SICD	Children in the sign training group scored higher than those in the control group for both receptive and

			Sign Training Group, verbal training group and non-intervention control	modeling gestures themselves; parents in verbal training group were encouraged to label as many things as possible Interviews every two weeks (frequency of target symbols modeled each day and use of gestures by child) Observed free play sessions	Receptive Expressive One Word Picture Vocabulary Tests (all at 11, 15, 19, 24, 30, 36 months)	expressive language, suggests that symbolic gesturing facilitates early stages of verbal language development; statistically significant effects were greater early on.
Gunderson & Levine, 2011	Investigate which types of number talk are predictive of child cardinal number knowledge	Prospective cohort	<i>N</i> = 44 14-30 month olds	90-minute videotaped interactions (number input) every four months between 14 and 30 months	PPVT- 46 months Point-to-X task-46 months	Parent talk involving counting accounted for 15.7% of variance in children's later number knowledge.
Haebig et al., 2013	Examine the association between language production and comprehension and two categories	Prospective cohort	<i>N</i> = 40 24-39 months old with ASD	Free play session (parent verbal responses to the child's focus of attention and responsiveness to	MCDI—36 months	Describing one's own actions and describing the child's focus of attention accounted for significant variance

	of verbal responsiveness in preschoolers and toddlers with ASD; examine if language input that follows the child's focus of attention or child's communication predicts gains in language one year later			communication acts)—24 months		in predicting language comprehension and production.
Hahn et al., 2014	Investigate if maternal gesture relates to speech production in children when fragile X syndrome	Prospective cohort	<i>N</i> = 27 25-37 month olds with fragile X syndrome	In home videotaped play sessions (types of maternal utterances and gestures) at age 25-37 months and 60-71 months	Mullen Scales of Early Learning- at 25-37 months and 60-71 months	Maternal gesture use was positively related to expressive language at both age periods and was related to receptive language scores in the early child period. Using gestures may help scaffold communicative interactions by providing children with more information about the message, which promotes comprehension.

Hampson & Nelson, 1993	Explore the relationship between maternal and child language at an early age	Prospective cohort	$N = 36$ 13 and 20 month olds (equal groups of early and late talkers)	Videotaped interactions (language input)		Mothers of early talkers provided a higher percentage of descriptions, repetitions, nouns, and object references than mothers of late talkers.
High et al., 2000	Evaluate the effects of a literacy promoting intervention delivered by pediatric providers as part of well-child care on parent attitudes and behaviors and on child language	Randomized control trial	$N = 205$ 5-11 month olds, with follow up at 18 months low-income	Families in intervention group received books and educational materials and advice about sharing books with children Parental interview	MCDI	Intervention families read more with toddlers and receptive and expressive vocab scores were higher in older intervention toddlers (18-25 months) but not in younger intervention toddlers (13-17 months). Shared reading frequency mediated the relationship between the intervention and language scores.
Hirsh-Pasek & Burchinal, 2006	Determine how sensitivity in caregivers from 6 months to 6 years relates to language and academic outcomes	Prospective cohort	$N = 1097$ <i>National Institute for Child Health and Human Development Study of Early Child Care and</i>	Videotaped semi-structured play sessions (maternal stimulation, sensitivity to non-distress, positive regard, and intrusiveness) at 6,	Observational Record of Caregiving Environment PLS- 54 months	First grade language, attention, and academic outcomes are correlated with maternal sensitivity.

			<i>Youth Development</i>	15, 24, 36, and 54 months	Woodcock Johnson Achievement and Cognitive Batteries Continuous Performance Task-1 st grade	
Hoff-Ginsberg, et al., 1998	Examine variation in mother's child-directed speech and rate of language development as a function of child birth order and SES	Prospective cohort	<i>N</i> = 63 18-29 months, half were middle-SES, half were high-SES	Two audiotaped interactions (total number of words, MLU, other coded speech) 10 weeks apart	Audiotaped interaction (Child rate of speech, total number of words, MLU)	Mothers in the high-SES group produced more speech, more contingent replies, longer MLU, less directives, and more questions compared to mothers in middle-SES group. High SES children showed more advanced lexical development and higher adjacent speech than mid-SES children. Mothers produced longer MLU to first born children and more conversation-eliciting questions to later born. First born children had richer vocabularies and higher MLUs. Later

						born children were more advanced in conversational skills.
Hoff, 2003	Determine if children from different SES groups have different productive vocabulary development because they have different language-learning experiences	Prospective cohort	<i>N</i> = 63 2 year olds, half middle-SES, half high-SES	Two audiotaped interactions (language input) 10 weeks apart	Two audiotaped interactions (child's language) 10 weeks apart	High SES mothers produced more utterances, word tokens, word types, higher MLU, and more topic-continuing replies. Children who heard longer MLU had greater vocabulary skills than children who heard shorter MLU. Mothers who spoke in longer MLU used more diverse vocabulary.
Hoff, 2006	Review evidence regarding ways in which social contexts affect language development	Literature review				Culture differences in the quantity and type of children's early language experiences have been linked with differences in language development. In cultures in which adults spoke directly to child, children began talking by producing single

						worlds. In contrast, children who replied predominately to overheard speech began talking by producing large memorized chunks of input. Language development proceeded less rapidly in cultures in which children were talked to less.
Hoff & Naigles, 2002	Investigate the relationship between features of input and productive vocab of two year old children	Prospective cohort	<i>N</i> = 63 18-29 months, half were middle-SES, half were high-SES	Two videotaped interactions (language input) 10 weeks apart	Two audiotaped interactions (child's language) 10 weeks apart	Quantity, lexical richness, and syntactic complexity related to two year old vocabulary. Number of words, number of word types, and MLU were related to lexical growth.
Huebner, et al., 2000	Evaluate an adaptation of a six week parent-child reading program	Randomized control trial	<i>N</i> = 129 24-35 month olds	Librarians taught parents reading techniques in two one-hour sessions Parent interview	PPVT EOWPVT Illinois Test of Psycholinguistic Abilities	There was a significant intervention-group effect on parent-child reading style and children's expressive language. Frequency of dialogic-reading behaviors increased

					Denver Prescreening Developmental Questionnaire	2.5 times in intervention parents. During reading, children used twice as many multiword utterances, more one-word utterances and had longer mean length utterances. Saw a medium effect size—difference in tests scores were 1.5 standard deviations different.
Huebner & Meltzoff, 2005	Evaluate how dialogic reading could be scaled into a community-based intervention	Randomized control trial	N = 95 2-3 year olds	Eight week intervention in one of three methods (in person with videotaped explanation, self-instruction by video, self-instruction with video and telephone coaching) Parent questionnaires	MCDI Parent-child reading recordings pretest and post-test	Instruction yielded more than a four-fold increase in parents' dialogic reading behaviors and had significant effects on language use, including number of words and MLU during shared reading.
Hurtado, Marchman,	Explore whether Spanish-learning	Prospective cohort	n=27	Free play session (assessed number	MCDI	Growth in vocabulary was greater between

<p>& Fernald, 2008</p>	<p>children's early experiences with language predict efficiency in real-time comprehension and vocab learning</p>		<p>18 and 24 month olds, low income, Spanish speaking</p>	<p>of utterances, word types, mean length of utterance, and number of words)</p> <p>Look-while-listening task</p>		<p>18-24 months in children whose mothers used more utterances and words at 18 months.</p> <p>Children whose mothers used more complex talk at 18 months were faster to process spoken language six months later (accounted for 18-26% of variance).</p>
<p>Huttenlocher et al., 1991</p>	<p>Examine role of exposure to speech in children's early vocabulary growth</p>	<p>Prospective cohort</p>	<p><i>N</i> = 22 14-26 months</p>	<p>Videotaped interactions (vocabulary size and total number of words mothers directed to children) in a 3 hour observation</p>	<p>Videotaped interactions</p>	<p>Quantity of parent speech accounted for variation in children's vocabulary growth.</p> <p>Frequency of exposure to words predicted acquisition of word.</p>
<p>Huttenlocher et al., 2010</p>	<p>Examine the role of caregiver speech in language development</p>	<p>Prospective cohort</p>	<p><i>N</i> = 47 14-46 months</p>	<p>Videotaped interactions in homes (parent lexical diversity, constituent diversity, and quantity assessed)</p>	<p>Videotaped interactions in home (child lexical diversity, quantity of speech, and constituent diversity)</p>	<p>Children's lexical diversity was predicted by caregiver lexical diversity and quantity of speech. Differences in syntactic structures in caregiver speech</p>

						<p>increased children's language growth.</p> <p>Caregiver input mediated the SES effects.</p>
Janjua, Woll, & Kyle, 2002	Explore the influence of different styles of parent-child interaction on the language development of very young deaf children	Prospective cohort	<p>$N = 13$</p> <p>under three years with severe bilateral sensorineural hearing loss</p>	Four videotaped (every three months for a year) sessions of parent book reading (ON acts and direct acts)	<p>Griffiths Mental Developmental Scales</p> <p>Bristol Language Developmental Scales</p>	Those with better language development had parents with higher percentage of directed related acts, ON acts, and appropriate responses to child communicative initiatives. Data suggest that allowing children enough initiative while being highly responsive and following the child's interests in conversation or play is important for development.
Karrass & Braungart-Reiker, 2005	Investigate whether shared book reading at 4 and 8 months would be associated with language abilities	Prospective cohort	<p>$N = 87$</p> <p>4, 8, 12, and 16 months</p> <p>Middle-SES</p>	Parent report of shared reading in home	<p>Information processing task</p> <p>BSID</p>	Shared reading at eight months was related to 12 month expressive language abilities and 16 month expressive language abilities

	at 12 and 16 months				SICD	beyond 12 month language scores. Reading at four months was not related to language outcomes.
Karrass & Braungart-Rieker, 2003	Investigate relationships among parenting, temperament, and early language	Prospective cohort	<i>N</i> = 102 12-16 month olds Middle-class	Five minutes of mother- infant free play (maternal responsiveness- warmth, sensitivity, leading), information processing task, stranger approach to elicit mild fear	BSID SICD Infant Behavior Questionnaire	Maternal responsiveness at 12 months was related to language at 16 months.
Kelley et al., 1998	Examined the degree to which parenting attitudes and behaviors were related to toddler's development	Prospective cohort	<i>N</i> = 54 1-3 year old African American children with a resident father	Father- toddler free play interactions	CARE- Index Parental Attitudes toward Childrearing Questionnaire Parenting Attitude Research Scale	Higher restrictiveness levels were associated with lower levels of cognitive development.

					<p>Vineland Adaptive Behavior Scales Survey</p> <p>BSID</p> <p>McCarthy Scales of Children's Abilities</p>	
Landry et al., 2003	<p>Examine whether consistency in mothers' responsiveness across childhood predicted more optimal cognitive development through eight years of age than responsiveness that was inconsistent or minimal</p> <p>Determine whether a parenting program during the first year of life results in greater gains in</p>	Prospective cohort	<p><i>N</i> = 331</p> <p>206 VLBW preterm infants</p> <p>125 full term infants</p>	<p>70 minute home observations (maternal warm responsiveness, flexibility responsiveness, and maternal stimulation) at 6, 12, 24 months, 3, 4, 6, and 8 years old</p> <p>Some mothers receiving training in responsive behaviors</p>	<p>BSID-6, 12, and 24 months</p> <p>SICD- 6, 12, 24 months</p> <p>Stanford Binet Intelligence Test- 3.5 and 4.5 years</p> <p>Clinical Evaluation of Language Fundamentals- 3.5 and 4.5 years</p>	<p>Consistent responsiveness across early childhood predicted faster rates of cognitive growth than did inconsistent or minimal responsiveness, particularly for preterm children. When mothers were minimally responsive, the negative impacts were greater for preterm children. Mothers assigned to receive training to use responsive behaviors displayed changes in behaviors that supported infant's vocalizations</p>

	child's development					and greater changes in cognitive skills.
Landry et al., 2001	Determine the role of early vs. ongoing maternal responsiveness in predicting cognitive and social development	Prospective cohort	<i>N</i> = 282 103 full term 102 low risk preterm 77 high risk preterm	70 minute home observation of daily activities (maternal warm responsiveness, flexibility responsiveness, maternal stimulation)- 6, 12, and 24 months, 3.5 years, 4.5 years	BSID-6, 12, and 24 months SICD- 6, 12, 24 months Stanford Binet Intelligence Test- 3.5 and 4.5 years Clinical Evaluation of Language Fundamentals- at 3.5 and 4.5 years	Children, especially preterm children, showed faster cognitive growth when mothers were consistently responsive. Rates of cognitive growth were slower for children whose mothers only were responsive in infancy and not throughout childhood.
Levickis et al., 2014	To determine the extent to which maternal responsive behaviors at 24 months predict child language at 24 and 36 months	Prospective cohort	<i>N</i> = 251 18 month olds scoring in the <20 th percentile on the 100 word parent-reported vocab checklist	Videotaped free play sessions at 24 months (maternal response behaviors of imitations, interpretations, labels, expansions, supportive directives and responsive questions)	PLS-4 (expressive and receptive language)- 24 and 36 months	Expansions, imitations, and responsive questions were strongly associated with better receptive and expressive language at 24 and 36 months. Only maternal behavior predicted improvement in

						language between 24-36 months.
Lugo-Gil & Tamis-LeMonda, 2008	Investigate the association between family resources, parenting quality, and child cognitive performance	Prospective cohort	<i>N</i> = 2089 low income children	Free play sessions during home visits at 14,24, and 36 months Parental interview	BSID HOME scale Nursing Child Assessment Satellite Training	Parenting quality and family resources were correlated with children's cognitive performance at 24 and 36 months. Parenting quality explained 10% of variance on the Bayley Scales at 14 months, and 32% and 40% at 24 and 36 months respectively. The effects of family economic resources were completely mediated by parenting quality.
Lyytinen et al., 2003	Examine effect of play and language behavior of mothers with or without reading disabilities on the language development of their children	Prospective cohort	<i>N</i> = 98 49 with dyslexia	Videotaped mother- child play (play related behavior and language) at 14, 18, and 30 months	MCDI Reynell Developmental Language Scales	Mothers' play language was significantly correlated with their children's language skills, especially in the reading disabilities group. Mothers with reading disabilities exhibited less self and other-directed pretend play

						and offered fewer linguistic cues to child for play.
Lyytinen et al., 1998	Examine the relationship between literacy activities, shared reading, and children's language skills	Prospective cohort	<i>N</i> = 108 14 and 24 month olds	Reading Habits Questionnaire Family Background Questionnaire	MCDI- 14 and 24 months BSID- 24 months	Children who were read to more frequently had larger vocabularies and greater interest in books. Literacy activities were related to children's language skills at both 14 and 24 months.
Magill-Evans et al., 1999	Identify factors that predict development of children at 18 months	Prospective cohort	<i>N</i> = 103 49 preterm (30-36.5 weeks gestational age) 54 full term	Interactions of parent and child at 3, 12, and 18 months	NCATS BSID SICD MCDI- 18 weeks corrected)	Mothers' interactions with child, child gender, and SES predicted 17% of variance on the BSID. Mother and fathers' interactions with child, child gender, and child's behavior predicted 22% of variance in receptive communication skills. Higher NCATS score predicted higher receptive language scores. Children had higher scores on the

						BSID when parents were more responsive.
Majorano et al., 2013	Examine relationships between characteristics of parental child-directed communication and language development	Prospective cohort	$N = 36$ 15 months, 21 months, 2.5 years, 3 years	Free play session (parent child-directed language, tutorial function, didactic function, conversational function, control function and asynchronous function)	MCDI- 2.5 and 3 years PPVT- 2.5 and 3 years	Following a child's focus of attention and responding to the child predicted the child's language comprehension and production. Quantity of words and frequency of words affected language production.
Martoccio et al., 2014	Examine joint attention at 14 months as a mediator between early mother-child interactions and later school readiness skills	Prospective cohort	$N = 127$ <i>National Early Head Start Research and Evaluation study</i>	Mother child interaction during semi-structured teaching tasks at 14 months	NCATS MCDI—Gestures subscale PPVT Leiter International Performance Scale Woodcock-Johnson III Tests of Achievement Letter	Joint attention behaviors at 14 months partially mediated the path between mother-child interactions at 14 months and later school readiness at 5 years of age. Mother-child interactions at 14 months significantly correlated with language and literacy at 5 years. Joint attention at 14 months mediated the effect between

					Word Identification and Applied Problem Solving Subscales at 5 years	interaction and school readiness.
Masur et al., 2005	Examine predictive relations between measures of mother's responsiveness, directedness, and child's expressive vocabularies.	Prospective cohort	<i>N</i> = 20 10, 13, 17, and 19 month olds	15 minute videotaped sessions during bath-time and free play Maternal interview at 10, 13, 17, and 19 months	Maternal Behavior Rating Scale—Responsiveness, Directedness, and Achievement Orientation Words, Sounds, and Actions Checklist	Maternal responsiveness at ten months predicted children's vocabulary at 13 months. During the period from 10-13 months when children's words are just emerging, behavioral and not verbal measures of responsiveness and supportive directedness positively predicted child's vocabulary. During interval from 13-17 months, mother's verbal imitation and follow utterances became predictive of children's lexical gains, but not behavioral.

Mendelsohn et al., 2010	Determine whether verbal interactions between mothers and their six month old infants during media exposure affect language development at 14 months	Prospective cohort	<i>N</i> = 253 6 and 14 month olds, low income	24 hour recall diaries for media exposure StimQ- six months	Preschool Language Scale- 14 months	Verbal interactions during media moderated the adverse impacts of media exposure on language development.
Murray et al., 1993	Compare speech of depressed and non-depressed mother during play with their infants at two months old	Prospective cohort	<i>N</i> = 59 0-18 months postpartum (n=20 control, n=29 depressed postpartum, n=10 history of depression)	Videotaped interactions every 2-3 months for 18 months (language input- length of utterance, repetition, syntax, focus, negative affect and ascription of infant agency)	Bayley Scales of Infant Development-18 months	Speech of depressed mothers expressed negative affect, was less focused on the infant's focus of attention, and contained more criticisms and corrections. Quality of maternal communication with the infant mediated the association between depression and scores on the Bayley Scales at 18 months. Greater infant-focused speech was strongly associated with higher scores on the Bayley Scales.

Naigles & Hoff-Ginsberg, 1998	Investigate the extent to which the nature of verb input accounts for the order in which children acquire verbs	Prospective cohort	<i>N</i> = 57 18-29 month olds	Two videotaped interactions (language input and child language) 10 weeks apart	Production of specific verbs	Frequency of verb use, frequency in final position in utterance, and diversity of syntactic environments in which they appeared were significant predictors of the order of acquisition of target verbs.
Needlman & Silverstein, 2004	Provide review of literature evaluating Reach Out and Read model	Review	12 studies evaluating Reach Out and Read	Article search ROR: book distribution program for low-income children ages six months-5 years old at well-child pediatric visits; pediatricians or pediatric nurse practitioners provide anticipatory guidance about book reading	Frequency and duration of book reading Child-centered literacy orientation	Reports of the effect of the intervention on the frequency of reading aloud, time spent reading aloud, and attitudes about reading were predominantly, but not uniformly, positive. Association between the ROR intervention and improved language development is particularly salient due to the close connection between preschool language ability and later school achievement.

Nicely et al., 1999	Investigate maternal responsiveness to infant expressivity in relation to language achievement	Prospective cohort	<i>N</i> = 77 9-21 month olds	Videotaped free play sessions Maternal interview (every two weeks from 9-21 months)	Early Language Inventory MCDI	Maternal responses that were attuned to infant affect were more predictive of children's language than maternal nonmatching responses. Maternal matching responses at nine months were more predictive of children's language achievements than responses at 13 months. Maternal matching responses at nine months explained 20% of variance in language outcome.
OshimaTaka ne et al., 1996	Investigate whether second-born children benefit from overheard conversations between caregivers and older siblings	Prospective cohort	<i>N</i> = 32 21 and 24 month olds, first born and second born children	Videotaped interactions (language input and child's language)	Production of pronouns tested with pointing task and picture task	Second-born children were exposed to more pronouns and were more advanced than first-born children in pronoun production but did not differ in general language.
Pan, Rowe, Singer, & Snow, 2005	Investigate predictors of growth in	Prospective cohort	<i>N</i> = 108	10 minute observation of free play session (child	Woodcock-Johnson Test of	Diversity of maternal vocabulary predicted growth in child

	toddler's vocab production between ages 1-3 years by analyzing mother-child communication		14, 25, and 36 months	vocabulary production and maternal language input)	Achievement—36 months	vocabulary production at 36 months. Word types were a stronger predictor that amount of words.
Panscofar & Vernon-Feagans, 2006	Examine differences in mother and father talk to their 24 month old children and how this language contributes to expressive language development at 36 months	Prospective cohort	<i>N</i> = 92 24 and 36 months, attend child care >15 hours per week	Free play sessions (language input: amount of talk, vocabulary, complexity, questions and pragmatics)	SICD- 36 months	Father vocabulary use contributed to 9% of expressive language skills at 36 months. In an overall regression model including parent education, quality of care, and all language input variables, mother and father language input accounted for 11% of variance.
Panscofar & Vernon-Feagans, 2010	Examine contributions of father's vocabulary and education during picture book interactions at six months of age to communication development at 15 months and expressive	Prospective cohort	<i>N</i> = 518 6, 15, and 36 month olds, two parent families	2.5 hour audiotaped book-reading (language input)-6months Parental K-FAST literacy screener	Communication and Symbolic Behavior Scale-15 months Preschool Language Scale-36 months	Father's use of diverse vocabulary was related to more advanced language development at 15 and 36 months. Mother's input did not seem to affect communication, suggesting that maternal and father language input may

	language development at 36 months					affect the child differently.
Patterson et al., 2002	Investigate the relationship of expressive vocabulary size with the frequency of being read to and frequency of watching TV in bilingual toddlers	Cross-sectional	<i>N</i> = 64 21-27 month old toddlers, homes in which English and Spanish were being spoken	Parental interview (estimate overall percentage of time their child was spoken to in each language, frequency of being read to, and frequency of watching television)	Spanish-English Vocabulary Checklist	The frequency of being read to in Spanish and English were related positively with expressive vocabulary size in the same language. It accounted for 7% of the variance in language scores.
Poehlmann & Fiese, 2001	Examine parent-infant interaction quality as a mechanism through which the combination of perinatal and sociodemographic risks predicts cognitive development in preterm infants	Prospective cohort	<i>N</i> = 84 44 full term infants, 20 LBW, 20 VLBW	Free play session (scored for reciprocity and engagement) at six months	Pediatric Infant Parent Exam at 12 months MCDI	Reciprocal and engaging dyadic interactions significantly predicted higher cognitive scores, controlling for neonatal and maternal risks. Positive interactions jointly reflect a mother's ability to read and respond to infant cues and ability to signal and respond to mother, which facilitated problem solving skills.

Raikes et al., 2006	Examine if reading relates to children's language and cognitive development within English and Spanish speaking samples	Prospective cohort	$N = 1101$ 14, 24, and 36 months old <i>Early Head Start Research and Evaluation Project</i>	HOME Parental interview (book reading frequency)	MCDI PPVT- 36 months	For English speaking children, concurrent reading daily and weekly at 24 months related to vocab and MCDI scores for English speaking children, controlling for 14 month vocab. For Spanish-speaking children, only daily reading at 36 months were associated with language and cognitive outcomes.
Read, 2014	Examine if rhymes would aid memory for words from storybooks and whether the way in which the rhyme sets up those new words makes a difference to how well children can retain and learn words	Randomized control trial	$N = 28$ 2-4 year olds	Storybook with six monster names and rhymes under different conditions	Identification of monster name	Children identified more monsters correctly in predictive rhyme condition, large effect $d = 0.66$. Parents' pause duration was longer when reading predictive rhyme (2.5x). When children heard a pause, they retained the monster name better.
Roberts & Kaiser, 2011	Evaluate effects of parent-implemented language	Meta-analysis	$N = 18$ studies	Parent-implemented language interventions		Parent-implemented language interventions have a positive effect on

	interventions on language skills of children between 18-69 months of age with language impairments		18-69 month olds with language delays			receptive and expressive language skills of children with language delays. Effect sizes ranged from -0.15 to 0.82. These interventions had the greatest effect on parent responsiveness.
Rodriguez & Tamis-LeMonda, 2011	Describe learning environment trajectories across children's first five years and relate these patterns to vocabulary and literacy skills in pre-kindergarten	Prospective cohort	<i>N</i> = 1852 14 month olds	Home Observation of Measurement of the Environment Videotaped mother-child interaction for 10 minutes; 45 minute parent interview Data collected at 14, 24, 46, or 60 months	PPVT Woodcock-Johnson Revised Tests of Achievement, Letter-Word Identification Subset	Learning environments accounted for over one standard deviation, or 32% of the variance, in children's performance in language and literacy skills at pre-kindergarten. Children with more supportive learning environments had higher scores on Letter Word Identification and PPVT.
Rodriguez et al., 2009	Investigate the relationship between children's participation in	Prospective cohort	<i>N</i> = 1046 14, 24, and 36 months old	10 minute mother-child play session coded based on Child-Parent	BSID-14 and 24 months	Literacy activities and maternal quality of engagement were correlated with

	literacy activities and the quality of mother's engagements on language and cognitive outcomes		<i>Early Head Start Research and Evaluation Project</i>	Interaction Rating Scales HOME	MCDI-14 and 24 months PPVT- 36 months	concurrent language and cognitive skills. Children's literacy experiences across three ages explained 27% of variance in children's BSID and PPVT scores at 36 months, suggesting that literacy environments at each age bore significance beyond experiences at the other two ages.
Rollins, 2003	Examine the relationship between caregiver input to nine month old infants and their subsequent language	Prospective cohort	<i>N</i> = 11 9, 12, 18, and 30 month olds	Free play session	Speech coded by Inventory of Communicative Acts MCDI-12 and 18 months Index of Productive Syntax-30 months	Caregiver contingent comments at nine months predicted the infant's language comprehension at 12 months and Index of Productive Syntax scores at 30 months. Total number of words predicted child's vocabulary comprehension at 12 months. Sixty-four percent of the variance in words understood at 18 months was attributable to

						caregiver contingent comments at nine months and joint attention at 12 months.
Rowe, 2008	Determine why parents from different SES backgrounds communicate in different ways with their children	Prospective cohort	<i>N</i> = 47 2.5 years, 3.5 years	90 minutes videotaped interactions (number of utterances, number of words spoken, sentence complexity) Knowledge of Infant Development Inventory	PPVT- 2.5 and 3.5 years	Language input explained 10% of the variance of vocabulary skills. Parent knowledge of child development mediated the relationship between SES and child-directed speech. More talk, more diverse and complex talk, and limited use of directive utterances were associated with a larger vocabulary in children.
Rowe, 2012	Examine the quantity and quality of caregiver input on vocabulary development	Prospective cohort	<i>N</i> = 50 14 month old children, followed until 54 months	Videotaped 90 minute parent-child interaction in home at 18, 30, 42 and 54 months	PPVT at 42 and 54 months	PPVT scores at 42 months were significantly related to parent word types at 30 months, and to parent rare word types. PPVT scores at 54 months were

						related to parent use of explanations and narratives.
Rowland et al., 2003	Assess contribution of input frequency to “wh-“ question acquisition	Prospective cohort	<i>N</i> = 12 2 year olds, 3 year olds	Audio recorded play sessions every three weeks for one year (language input)	Audio recorded play sessions (frequency of child’s use of “wh” question words)	Frequency of using “wh” question words predicted child’s acquisition of “wh“ question words.
Saint-Georges et al., 2013	Systematic review of literature regarding role of infant-directed speech on infant development	Systematic review	144 studies, infant-directed speech			Infant-directed speech promoted infant’s language learning. Characteristics of infant-directed speech helped infants discriminate between syllables, segment speech into units with grammatical rules, and speech processing.
Schmidt & Lawson, 2002	Investigate the relationship between aspects of caregiver attention-focusing events and later verbal IQ for VLBW children	Cross-sectional	<i>N</i> = 26 24 months VLBW	Videotaped caregiver-child interaction (attention focusing gestures, attention orienting speech, gesture-speech combination)	Stanford-Binet Intelligence Scale—36 months	Caregiver gesture with descriptive speech positively influences later language performance.
Schmitt et al., 2011	Assess relation between home	Prospective cohort	<i>N</i> = 50	Home literacy environment	MCDI	Home literacy environment

	literacy environment and early language acquisition during infancy and toddlerhood		16-21 month olds follow up study- <i>N</i> = 27 of original children between 34-40 months	Children's Title Checklist Home Literacy Environment Questionnaire 10 minute observation	Computerized Comprehension Task	questionnaire scores accounted for a significant increase in variance on the MCDI and the Computerized Comprehension Task (13-31%). Results suggest that comprehension in the second year of life is supported by activities that involve communicative engagement.
Shannon et al., 2002	Explore associations between father-child interactions and child's cognition in low-income families	Cross sectional	<i>N</i> = 65 24 month olds, low income infants	Videotaped father-child interactions (quality of father-child interaction)	BSID Caregiver Child Affect, Responsiveness, and Engagement Scale	Fathers' scores on the Responsive-didactic factor (behavior that was didactic, positive in affect, responsive and emotionally attended to child) correlated with performance on the Bayley's MDI. Children in normal range on BSID were five times more likely to have a warm, communicative father.

Shneidman et al., 2013	Investigate the effect of linguistic input on vocabulary acquisition in children	Prospective cohort	<i>N</i> = 30 (15 multi-speaker, 15 single speaker) 14 month olds and 3.5 year olds	Videotaped interactions (language input and child language)	PPVT- 3.5 years	Number of words spoken by parent predicted PPVT at 3.5 years. Overheard words added no predictive value. For every one standard deviation in words from caregiver at 2.5 years, there was a 0.54 standard deviation difference in children's PPVT scores at 3.5 years.
Shneidman et al., 2012	Explore the impact of directed vs overheard speech and child vs. adult speech on Mayan children's later vocabulary outcomes	Prospective cohort	<i>N</i> = 15 24 and 35 months, Mayan	Videotaped interactions (language input- number of different words and utterances)	PPVT- 35 months EOWPVT- 35 months	Overheard words did not relate to subsequent vocabulary. Each one standard deviation in number of words from caregiver at 24 months was associated with a 0.89 standard deviation in vocabulary score.
Smith et al., 1996	Evaluate cognitive, language, and daily living skills of infants in	Prospective cohort	<i>N</i> = 340 212 VLBW preterm infants 128 term infants	Home visits- one hour observation of daily activities	BSID SICD	Warm sensitivity and proportion of interactions in which mothers maintain their infant's

	relation to warm sensitivity, maintenance of attention, and directedness		six months old, low income	Ten minutes of toy-play session (maternal warm sensitivity, maternal attention directing events) at 6 and 12 months		attention were significant in predicting outcomes. Higher level of maternal attention-maintaining was associated with higher mental ages and higher receptive and expressive language scores. This relationship was stronger for preterm infants, suggesting that they need more support.
Song et al., 2010	Examine how 19 month old word recognition is affected by slow speaking rate, vowel hyper-articulation, and wide pitch range	Cross-sectional	<i>N</i> = 48 19 month olds	Presented with audio stimuli in either infant-directed speech or speech that lacked an acoustical property of infant directed speech	Look-while-listening task	Slow speaking rate and vowel hyper-articulation improved ability to recognize words, whereas wide pitch range did not.
Song et al., 2012	Investigate parental language context and infants language experiences in relation to Dominican American and	Prospective cohort	<i>N</i> = 155 14 months and 2 years, low-income	Parental interview about literacy activities Videotaped interactions (number of	MCDI (both Spanish and English)	Parent language utterances and engagement in literacy activities were positively associated with vocabulary scores.

	Mexican American infants' vocabularies.			utterances) at 14 months and 2 years		
Szagan & Stumper, 2012	Investigate the influence of age at implantation on language development in children with cochlear implants	Prospective cohort	<i>N</i> = 25 6-42 months olds cochlear implant patients	45 minute free play session at 4 points (12, 18, 24, and 30 months after implantation)	MCDI	Maternal language input, MLU, and expansions were associated with children's linguistic progress. Maternal MLU and expansions at 12 and 18 months post-implantation were correlated with child's MLU at 24 and 30 months post-implantation.
Tamis-LeMonda, et al., 2001	Examine contributions of maternal responsiveness to timing of first imitations, first words, 50 words in expressive language, combinatorial speech, and use of language to talk about the past	Prospective cohort	<i>N</i> = 40 9 and 13 month olds	Free play sessions	Early Language Inventory MCDI 13 months	Responsiveness at 9 and 13 months strongly predicted timing of the achievement of language milestones. Maternal responsiveness explained between 20-53% of variance in language.

Tamis-Lemonda et al., 2004	Assess the contributions of father-child and mother-child interactions during free play at 24 and 36 months on cognition	Prospective cohort	<i>N</i> = 290 24 and 36 month olds	Videotaped interactions (sensitivity, positive regard, cognitive stimulation, intrusiveness, detachment, negative regard) at 24 months	BSID PPVT NICDH Study of Early Child Care's Three Box Scales At 36 months	Mothers' and fathers' sensitivity, positive regard, and cognitive stimulation were associated with higher BSID scores and PPVT scores. Negative regard, intrusiveness, and detachment were inversely associated with child outcomes.
Tardif et al., 1997	Determine if variations in the proportions of nouns and verbs in a children's early vocabulary is dependent on caregiver speech	Cross-sectional	<i>N</i> = 22 22-24 month olds, English and Mandarin speaking children	Coded speech (nouns, verbs, placement of subjects within an utterance, child utterances, utterance initial and utterance final words, function and focus of adult-to-child interrogatives)	Coded speech (nouns, verbs, child utterances)	Speech of English-speaking caregivers emphasized nouns over verbs and English-speaking children spoke more nouns. Mandarin-speaking caregivers emphasize verbs and Mandarin children spoke more verbs
Tomopoulos et al., 2006	Describe relationships between books and toys in the home, parent-child interaction, and child development	Prospective cohort	<i>N</i> = 43 6, 18, and 21 month olds	StimQ- 16 and 18 months 10 minute videotaped free play (language	BSID Preschool Language Scale	Books at 18 months predicted cognition and receptive language. Availability of fine motor/adaptive toys at both 6 and 18 months predicted

				input and communication)	Caregiver-Child Interaction- 21 months	receptive language. Reading aloud by parents affected early intervention eligibility—75% of children who were read to less than one day a week met eligibility whereas only 36.8% of children read to four or more days met eligibility criteria.
Taylor et al., 2008	Evaluate the extent to which maternal responsiveness predicted children's 8 year old decoding and reading comprehension skills for children who varied in biological risk (term vs preterm)	Prospective cohort	<i>N</i> = 238 83 full term 155 preterm (VLBW) attrition was 25% by year 8	Home visits of 60 minutes of daily activity and 10 minutes toy- play session- 6, 12, 24, 36, 48 Cognitive skills- 4 years Reading and comprehension skills- 8 years	Warm acceptance scale Stanford Binet Intelligence Scale Woodcock Johnson Tests of Cognitive Ability	Maternal responsiveness predicted children's reading comprehension skills at eight years of age, especially for preterm children. When SES and maternal age were controlled, maternal responsiveness interacted with children's cognitive abilities in relation with later reading comprehension skills.

Topping et al., 2013	Investigate how and why parent-infant interactions contribute to language development between the ages of 0-3 years	Systematic literature review	60 articles			Parent-infant interaction is a key factor in language development. High SES mothers talk more to their children than low SES mothers and this has effects on the language development of the child. High SES mothers used richer vocabulary, were more contingent, and issued fewer directives and asked more questions.
Trautman & Rollins, 2006	Investigate caregiver conversational style and gestures on infants' engagement and later language	Prospective cohort	<i>N</i> = 10 12 month olds	20 minutes of free play (caregiver-child interaction tasks) parental narration of caregiver on joint task 12 and 30 months	MCDI Index of Productive Syntax Inventory of Communication Acts	Infant language learning outcomes at 30 months were affected by total amount of time spent in coordinate joint engagement and passive joint engagement. There was a negative association between productive syntax and time in passive joint engagement. Total amount of talk and

						child-centered acts were related to language outcomes whereas directive acts were not.
Tsybina & Eriks-Brophy, 2010	Examine effects of a dialogic book-reading intervention for 22-41 month old bilingual children with expressive vocabulary delays	Randomized control trial	$N = 12$ $n = 6$ experimental group, $n = 6$ control group 22-41 month old bilingual children with expressive vocabulary delays	30 15-min sessions using dialogic book-reading strategies were provided in both Spanish and English Free play sessions	MCDI	Children in the target group learned significantly more words in each language following intervention and six weeks after the intervention. Children in the intervention group learned 10.9 words whereas children in the control group learned 1.4 words.
Valdez-menchaca et al., 1992	Extend the dialogic reading program to Mexican low-income children	Randomized control trial	$N = 20$, two year olds low-income in Mexican daycare	30 10-12 min dialogic reading training sessions over seven weeks	PPVT EOWPVT Denver Developmental Screening Test	Dialogic reading program had a positive impact on the language skills of children in daycare for all measures.

					Illinois Test of Psycholinguistic Abilities	
Warren et al., 2010	Investigate relationship between maternal responsiveness and later child communication outcomes in young children with fragile X syndrome	Prospective cohort	<i>N</i> = 55 11-48 months of age, 26-64 months, 40-76 months, fragile X syndrome	Videotaped four different interactional contexts (reading a book, eating together, play, and natural content)	Mullen Scales of Early Learning	Early maternal responsively predicted rate of total communication and number of different words at 36 months of age.
Weisleder & Fernald, 2013	Explore if the amount of speech directed to infants in low SES, Spanish-speaking families influence the development of children's skill in real-time language processing and vocabulary	Prospective cohort	<i>N</i> = 29 19-24 month olds, Spanish-speaking and low-income (\$25-75,000)	LENA language recorders at 19 months	MCDI Look-while-listening task at 24 months	Children who heard more child-directed speech at 19 months had larger vocabularies and greater language processing efficiency at 24 months. Differences in overheard speech directed to other adults were not related to vocabulary size.
Westerlund & Lagerberg, 2008	Examine the associations between children's language development and	Cross-sectional	<i>N</i> = 1091 17-19 month olds in Sweden	Maternal interview about communication and reading frequency	Swedish Communication Screening (similar to MCDI)	Frequent reading was significantly associated with expressive vocabulary. Reading

	reading habits, maternal education, maternal age, child temperament, gender, and birth order					at least six times/week added more than 0.4 standard deviation (medium effect size) in vocabulary regardless of communication. Good communication quality was significantly associated with expressive vocabulary.
Willis et al., 2007	Describe lessons learned from Reach Out and Read Program	Review	12 studies evaluating Reach Out and Read	Article Search ROR: book distribution program for low-income children ages six months-5 years old at well-child pediatric visits; pediatricians or pediatric nurse practitioners provide anticipatory guidance about book reading	Child-centered literacy orientation MCDI PPVT	Benefits of Reach Out and Read include increased language development, higher standardized vocab scores for receptive and expressive language, positive changes in attitudes about reading, contribution to a positive home literacy environment.

Yoder & Warren, 2002	Tested effect of a teaching intervention on children with intellectual disabilities	Randomized control trial	<i>N</i> = 39 average of 21 months, mental age of 14 months intellectual disabilities	15 minute free play session (parental responsiveness), treatment group received session 3-4x per week for 6 months and 12 responsive parent education classes	Communication and Symbolic Behavior Scales Communication Temptations and Book Sharing Communication Development Inventory Infant Scale	Intervention (RPMT) increased number of child communication acts to which parents optimally responds. It increased frequency of child-initiated comments, frequency of child-initiated requests and lexical density.
Yogman et al., 1995	Assess the effect of father involvement on the intellectual outcomes of low birth weight preterm infants	Prospective cohort	<i>N</i> = 985 low birth weight preterm infants at 4, 8, 12, 18, 24, 30, and 36 months corrected age	Paternal presence in the home and the amount of play with infant Maternal interview of paternal involvement	Stanford Binet Intelligence Scale-36 months	Mean IQ for the high-involvement group was six points higher than the low-involvement group.
Zimmerman, 2009	Test the association of adult language input, television watching, and adult- child conversations on language acquisition among	Prospective cohort	<i>n</i> =257 for cross sectional; <i>n</i> =71 for longitudinal over 18 months 2-48 month olds	LENA language recorders- one day a month for 6-18 months	Preschool Language Scale	Adult word count influenced language development and was mediated by adult-child conversations. Each 100 words and conversational turns were associated with

	infants and toddlers					a 0.44 and 1.92 point increase in the Preschool Language Scale, respectively. Similar patterns were seen in the longitudinal study.
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SES: socioeconomic status; LENA: Language Environmental Analysis; MCDI: MacArthur-Bates Communicative Development Inventory; PPVT: Peabody Picture Vocabulary Test; NICU: neonatal intensive care unit; EOWPVT: Expressive One Word Picture Vocabulary Test; SICD: Sequenced Inventory of Communication Development; BSID: Bayley Scales of Infant Development Mental Development Index; ROR: Reach Out and Read; HOME: Home Observation for Measurement of the Environment; NCATS: Nursing Child Assessment Teaching Scale; LBW: low birthweight; VLBW: very low birthweight