Advanced Review

Language learning, socioeconomic status, and child-directed speech

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Young children's language experiences and language outcomes are highly variable. Research in recent decades has focused on understanding the extent to which family socioeconomic status (SES) relates to parents' language input to their children and, subsequently, children's language learning. Here, we first review research demonstrating differences in the quantity and quality of language that children hear across low-, mid-, and high-SES groups, but also—and perhaps more importantly—research showing that differences in input and learning also exist within SES groups. Second, in order to better understand the defining features of 'high-quality' input, we highlight findings from laboratory studies examining specific characteristics of the sounds, words, sentences, and social contexts of child-directed speech (CDS) that influence children's learning. Finally, after narrowing in on these particular features of CDS, we broaden our discussion by considering family and community factors that may constrain parents' ability to participate in high-quality interactions with their young children. A unification of research on SES and CDS will facilitate a more complete understanding of the specific means by which input shapes learning, as well as generate ideas for crafting policies and programs designed to promote children's language outcomes.

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INTRODUCTION

Infants are considered to be rapid learners of language, yet there is substantial variation in the development of language and communication skills across different children. One major source of this variability is socioeconomic status (SES). On average, children from lower-SES families show slower vocabulary growth relative to their higher-SES peers,[1] and these differences persist into the school years.[2] From where do these differences arise? Research suggests that variation in parents' speech to children—as a function of SES—relates to children's language development. For example, Hart and Risley revealed dramatic differences in the amount that parents talk to their young children as a function of SES.[3] Their estimations suggest that by age 4, children from professional families hear a total of 45 million words on average, while children living in poverty hear 13 million words on average. This finding is often described as the '30 million word gap.' Importantly, quantitative differences in parents' language input have been shown to uniquely predict aspects of children's language development, such as vocabulary growth and speed in processing familiar words.[3,4]

While the total quantity of words in children's language environments may play a role in promoting learning, many investigations have also examined SES differences in qualitative features of input,[3,5–7] and some research suggests that these features may be more important than the total amount of speech.[8,9] 'Quality' of speech has been measured in many ways, ranging from lexical diversity to conversational fluency, but the key finding is that there are differences in a variety of measures across SES groups, and these differences seem to relate to children's language development. Additionally, while there are differences in quantity and quality of

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input—and subsequent learning—between SES groups, differences have also been found *within* SES groups.[4,8–11]

But what defines 'high-quality' language input? Research on child-directed speech (CDS) has provided answers to this question, although much of this work has not addressed SES-related variation. CDS, also known as 'motherese' or 'parentese,' refers to the speech style caregivers often use with their children, characterized by higher pitch, shorter utterances, more repetition, and other features that differentiate it from adult-directed speech (ADS).[12–14] Young children have been shown not only to prefer listening to CDS over ADS but also to learn better from it (see reviews by Soderstrom[15] and Golinkoff and colleagues[16]). Thus, CDS is a particularly beneficial form of language input for children, and researchers have focused on determining the *specific* characteristics of CDS that directly influence young children's language development. This work has uncovered phonological, lexical, grammatical, and social cues of CDS that affect children's learning of sounds, words, and sentences.[17–23]

In this review, we discuss these two related literatures—research on SES-related differences in input and learning, and research on particular features of CDS that influence learning—in order to consider the complexities of interactions between SES, parents' language input, and children's language development. The unification of these literatures offers a fruitful direction for future research. Throughout this review, we refer to 'SES' using the most common metrics in the field, which include parental education, parental occupation, family income, or combinations of the three (see Ref 24 for a comparable approach). Importantly, SES-related differences in language input and learning are not limited to families beneath the poverty line, as family income is just one way to measure SES, and other variables may combine with income in influencing children's language environments. According to Hoff, the most relevant component of SES for children's language development may be maternal education, rather than household income per se, but the effects of SES on early language development are robust across a variety of measurement approaches.[25] Additionally, our review examines research on SES, CDS, and language learning primarily in the United States, but a complete picture of the mechanisms behind input and learning will need to include research on other regions and cultures.[26–29]

We first provide an overview of current findings regarding parents' language input and children's language learning both across and within SES tiers (but see Ref 30 for a historical summary of research on variability in children's language environments and outcomes). Second, we overview research on specific characteristics of CDS that seem to matter most for learning sounds, words, and sentences. We then briefly discuss the relevance of household and community factors as forces that potentially constrain parents' ability to engage in high-quality interactions with their children. Together, the research reviewed here underscores the need to uncover which particular features of CDS differ across the SES spectrum and which do not, and how the broader contexts of families, homes, and communities interact with these features to shape children's language environments. Progress toward this end will provide a high-resolution picture of how SES differences in language input relate to children's language learning, and supply concrete ideas for interventions that promote children's language outcomes.

LANGUAGE AND SOCIOECONOMIC STATUS

Differences in Language Input and Learning Across SES Groups

In order to determine whether differences in parents' language input explain SES differences in children's language development, researchers have had to characterize these input differences. For example, research on the play behaviors of low-SES and mid-SES mothers and their 12- to 18-month-old infants showed no differences in amount of play or social goals, but did uncover significant differences in parents' language behavior, with mid-SES mothers tending to incorporate language goals more often into their play.[31] A number of studies have also focused on differences in talk to toddlers in high-SES compared to mid-SES families, revealing that middle- and upper-middle-class parents (relative to working class parents) tend to speak more, use more word types and word tokens, respond more often in a topic-continuing manner to children's utterances, and focus less on directing children's behavior.[32–35] Overall, these data have revealed clear differences in parents' language input between low- and mid-SES groups and between mid- and high-SES groups.

Hart and Risley's research revealed even larger differences in amount of parents' language input across low-, mid-, and high-SES groups, and also demonstrated that these differences may have implications for children's learning.[3] The researchers found that the average amount of talk young

children in their sample heard ranged from less than 200 words per hour to over 3,000 words per hour. Differences in amount of talk also correlated with SES: parents from professional families talked significantly more on average to their children than those from working-class families and families in poverty. Moreover, SES differences had important implications for children's language development, as amount of talk correlated with toddlers' vocabulary growth. Subsequent research showed that SES differences exist not only in spontaneous speech but also in book reading,[36] which may have consequences for children's learning of new vocabulary.[37,38]

In addition to differences in amount of parents' input across social classes, Hart and Risley also explored differences in input quality. They found that the average child living in a professional-class family heard significantly more affirmations (i.e., encouragements) and fewer prohibitions (i.e., discouragements) than those living in poverty.[3] More recently, Rowe examined differences in both the amount and quality of parental interactions with children across a wide span of the SES spectrum, as well as how these differences relate to children's language development.[7] Measures of quality included parents' use of diverse vocabulary, rare words, and decontextualized language (e.g., narratives and explanation). Rowe found that SES was related to both quantity and quality measures, with more highly educated parents using more word tokens and word types, as well as more rare words and more of some types of decontextualized utterances. SES and input both related to children's later vocabulary scores.

SES differences in language input seem to relate not only to children's vocabulary, but also to their grammar. Diversity of caregivers' speech (i.e., the variety of words, phrases, and clauses produced) has been linked to children's language development, with diversity of earlier caregiver speech predicting similar diversity in children's later speech production.[5,39] This applies to preschool classrooms as well: toddlers showed greater grammatical development over the course of a year when their preschool teachers' speech was more grammatically complex.[39] Moreover, SES has been found to be a significant predictor of syntactic diversity—within and across clauses—in both parents' speech and children's later speech, with SES differences in children's speech partially mediated by caregivers' speech.[5] Yet the extent to which there are SES differences in children's grammatical development may depend on the complexity of the structures being investigated. In learning the basic rules of clause formation, Vasilyeva and colleagues found that children from different SES groups showed no systematic variation in terms of age of acquisition or in the proportion of sentences used correctly.[40] However, significant SES differences were shown in children's use of complex sentences: children from higher-SES families produced complex sentences earlier and used these types of sentences more often than children from lower-SES families.

While longitudinal research on parents' language input has revealed SES differences in the grammatical complexity and diversity of speech to children, parents across the SES spectrum have been shown to increase the complexity of their input as their children age.[41] When researchers followed children from a wide range of SES backgrounds from 14 to 46 months, they found that the number of different words children knew was associated with the variety of words used in their parents' later speech.[5] Across the SES spectrum, parents' speech seems to change according to the language level of their child, even though overall SES-related differences persist over time. This suggests that children's own language abilities may influence their parents' subsequent language input, which then affects their own later learning. Relatedly, differences in children's use of gesture have been shown to partially mediate the relation between SES and child vocabulary development.[42] The authors suggest that children's own gesturing may elicit further parental communication, which then provides children with more opportunities to learn new words. Interestingly, this bidirectional relation between children's and parents' language usage may not apply to all levels of language. In particular, research has shown that measures of syntax in children's earlier speech, such as constituent and clausal diversity, do not significantly predict measures of syntax in parents' later speech.[5] Moreover, the interaction of SES, input variability, and learning does not occur independently from age-related developmental changes; regardless of input quality, as children get older, their speech becomes increasingly complex. Importantly, however, the pace of children's language learning across time relates to the lexical and grammatical richness in early language experiences.

While parents' communication with their children is associated with children's learning across the developmental timeline, the earliest stages of childhood are likely to be particularly important for shaping children's language abilities. By 18 months, group-level differences in vocabulary knowledge and language processing efficiency (i.e., comprehension of language in real time) between lower-SES and higher-SES toddlers are already apparent.[43] By 24 months, there is a 6-month gap between SES groups in

language processing efficiency, which has been shown to forecast later language learning.[44,45] Thus, infants hearing more rich language from their caregivers early in life develop stronger language processing skills, which can affect their ability to learn new words more quickly, and this in turn seems to influence their ability to process future sentences containing those words.[4,30] These cascading effects are evident in the finding that toddlers' processing speed and vocabulary size account for unique variance in later language and cognitive skills at the age of 8.[45] Other research suggests that the pace of early vocabulary growth predicts children's later vocabulary and school readiness skills,[46] and children's oral language skills at the start of kindergarten help explain the effect of SES on elementary school performance, which has in itself been shown to predict later academic success.[47]

The past few decades of research have revealed significant SES differences in both the amount and quality of parents' speech to their children. These differences relate to the development of children's vocabulary, grammar, and language processing speed, at least partially accounting for SES differences in children's language outcomes. Over time, some aspects of toddlers' own language use may also influence their parents' subsequent language input. If this bidirectional relation between caregivers' input and children's production begins early on in life, children are likely to show accelerated language growth. SES differences in children's language development emerge early, and children's language skills in early years are highly predictive of their later language and academic outcomes.

Differences in Language Input and Learning Within SES Groups

There are sizable group differences in parents' language input and children's language learning across the SES spectrum, but are there also differences *within* SES groups? While the focus on differences between higher- and lower-SES groups has been important for unearthing social disparities in language learning, this focus has clouded the essential—even hopeful—finding that variability in input and learning exists within narrower SES ranges. In a sample of families from a middle-class neighborhood, Huttenlocher and colleagues showed early evidence of the relations between maternal talk and child vocabulary.[48] Other research has converged with these findings in showing individual differences in input and learning in higher-SES groups,[49–51] but there are also notable differences in amount and lexical diversity of maternal talk to young children within samples of low-SES families.[11,52] For instance, researchers followed a group of low-SES families and found that when children were between 14 and 36 months of age, mothers varied significantly in the amount and diversity of words spoken to their children,[11] and there was also large variation in vocabulary growth across children (as measured by number of word types and tokens).[8] Moreover, diversity of maternal lexical input predicted vocabulary growth, as did maternal literacy skills, but amount of maternal talk did not.[8] This suggests that while quantity of verbal input differs on average across social classes, quantity alone may not be a robust predictor of vocabulary production for children from low-SES families.

Recent work by Hirsh-Pasek and colleagues examined the extent to which the quality of parent–child communication—as opposed to the quantity of input—was related to children's language development in 60 low-income families.[9] Their particular measures of quality were (1) children's joint engagement with symbols (e.g., using iconic gestures and words as they participated in activities with their caregivers), (2) routines and rituals shared by the parent and child (e.g., book reading), and (3) fluency or connectedness of the exchange. The researchers found individual differences in the quality of these interactions at 24 months, and these differences accounted for a significant proportion of variability in children's expressive language at 36 months. Hierarchical regression analyses showed that these measures of quality accounted for a much larger proportion of variance in children's expressive language than measures of language input quantity (maternal words per minute). That is, within this low-SES sample, measures of the quality of mother–child communication more strongly predicted children's expressive language abilities one year later than did the total number of words spoken by mothers.

Hurtado and colleagues showed that differences in language input within low-SES Spanish-speaking families not only related to children's vocabulary growth, but also to their language processing efficiency.[10] Input quantity (i.e., speaking more utterances to children) and input quality (measured by diversity of words and mean length of utterance) both predicted children's later efficiency in understanding spoken language. That is, children from low-SES families whose mothers spoke to them using more complex language at 18 months were significantly faster in a real-time comprehension task at 24 months.

Collectively, this research shows that there are sizable differences in parents' language input and children's language development within SES groups, indicating that the relation between SES and language use and outcomes is not fixed. Group differences suggest that higher-quantity and higher-quality language is more likely to be used in the homes of higher-SES parents, but critically, many lower-SES parents do offer enriching language environments to their children. Research on parent–child communication both between and within SES groups suggests that parents' input is key to children's learning.

CHILD-DIRECTED SPEECH

Differences in the quantity and quality of speech addressed to children relate to observed SES differences in children's language outcomes. Yet in order to determine how learning can best be improved between and within higher- and lower-SES groups, it is important to narrow in on specific characteristics of input that directly influence learning. In particular, research on CDS has started to examine which particular features of caregivers' speech comprise 'high-quality' input. Given that hearing more CDS has been linked to more successful language development,[14] determining which features of CDS drive successful learning will be important for promoting better language outcomes. Here, we focus on research that points to specific features of parents' input that may underlie the benefit of CDS. We refer to both infant-directed and child-directed speech as 'CDS,' but we end by discussing potential age-related differences in the optimal speech input for young children's learning.

One particularly defining feature of CDS is its prosody. There are clear prosodic differences between CDS and ADS, such as higher pitch, exaggerated vowels, and final-word lengthening (see reviews by Cristia[18] and Soderstrom[15]). Moreover, from birth, infants exhibit a preference for listening to CDS compared to ADS.[53–56] But do sound-level characteristics of CDS—such as its clear, melodic, and high-pitched speech register—actually help infants and young children in their language learning?

Maternal speech clarity in CDS seems to be important for phonological development. One study found that mothers' clarity (i.e., the extent to which they expand their vowel space) was correlated with speech discrimination performance in Mandarin-learning infants.[57] Laboratory studies have also revealed better speech discrimination in infants listening to CDS compared to ADS. In one study, 1- to 4-month-old infants were able to detect phonemic differences between subtly distinct syllable sequences with contrastive middle syllables (e.g., 'marana' vs 'malana') only in CDS, which had a combination of higher mean pitch, larger amplitude, and longer syllable duration than ADS.[58] In other research, large pitch contours, or the rising and falling patterns of pitch change that tend to occur in CDS, have been shown to enable better vowel discrimination in young infants.[17] Interestingly, speech that is only characterized by higher mean pitch—another characteristic feature of CDS—actually seems to hinder vowel discrimination, highlighting that specific features of CDS might be differentially helpful for different aspects of language learning.[17] Such specificity is especially evident in a study with 5- and 13-month-old infants showing better discrimination of /s/ sounds when caregivers produced clear, more 'acoustically extreme' tokens of /s/.[59] Thus, fine-grained differences in maternal speech clarity even seem to influence the formation of individual sound categories.

Sound-level characteristics of CDS not only support young children's learning of sound categories, but also their word segmentation and word-learning abilities. In one study, 6.5- to 7.5-month-old infants were able to segment word-like units from artificial speech presented in CDS (characterized by prosodic characteristics such as exaggerated pitch contour), but not in ADS, even when the experimenters controlled for stress marking, such that the only cue to word boundaries was the statistical structure of the speech.[60] Other work has revealed that prosodic characteristics of CDS promote the mapping of new labels onto objects, as well as long-term memory for words.[61,62] In one study, 6-month-old infants could successfully segment novel words and map them onto novel objects only after being exposed to artificial speech in which word forms aligned with prosodic phrase boundaries.[22] Similarly, data from the Human Speechome Project—in which a single child's language input and output was extensively recorded between the ages of 9 and 24 months—showed an association between prosodic characteristics of specific word forms and the child's age of producing the words.[63] Words that were louder, longer, and higher in pitch in parent speech were produced by the child at an earlier age.

Prosodic and sound-level characteristics of CDS may also help infants find grammatical units.[18] Infants have been shown to be sensitive to the acoustic boundaries of clausal units in CDS by displaying preferences for sequences of words occurring within prosodically cohesive clauses (where pauses occur

between clause boundaries instead of within a clause).[21,64,65] Infants as young as 6 months have also shown similar sensitivity to prosodic markers of smaller syntactic units (i.e., phrases).[66,67] Additionally, infants' preferences for prosodically cohesive syntactic units of speech seem to occur when listening to CDS stimuli, but not ADS stimuli.[68] Infants' increased sensitivity to statistical properties of CDS compared to ADS—and the subsequent improvement in their learning of word boundaries, word forms, and grammatical units—may be attention-based. That is, infants show a preference for listening to CDS, and greater attention to this speech register may engender more successful detection of relevant structure.

In addition to prosodic and sound-level features, CDS includes a number of structural features at the level of words and sentences that likely aid young children in their language learning, such as short utterances and repetition.[12,13,69] Research on utterance length shows that parents' use of isolated words (i.e., single words with pauses at their edges), a common feature of naturally occurring CDS,[70,71] supports infants' word segmentation.[20] Specifically, when 8- to 10-month-old infants were exposed to fluent Italian speech containing either fluent speech alone or a combination of fluent speech and isolated words, they were only able to segment words that appeared both in fluent speech and in isolation.[20] In addition to instances of single-word utterances, CDS is characterized by the use of short utterances in simple sentence frames. Cameron-Faulkner and colleagues found that approximately half of all CDS utterances are heard in one of 52 sentence frames, such as *Look at the* ____ and *Where is the* ____?[72] Fernald and Hurtado explored the real-time processing of sentences that included these frames, and showed that 18-month-olds were faster to interpret familiar nouns when they were heard in sentence frames compared to being heard in isolation.[23] Thus, the presence of isolated words in CDS promotes infants' ability to segment fluent speech, and the use of short, familiar sentence frames influences toddlers' processing of familiar nouns.

Researchers have also found that repetition and partial repetition of utterances is a defining structural feature of CDS.[12,13,73] In particular, corpus analyses have shown that a high proportion of CDS utterances contain words that are repeated in successive utterances, also known as partial self-repetitions or variation sets.[74,75] This type of partial repetition has been shown to enhance word segmentation in an artificial language learning study with adults.[75] Moreover, a longitudinal study of parent–child dyads found that parents' partial repetition of multiword constituents was correlated with children's subsequent production of those constituent structures (as cited in work by Brodsky and colleagues[76]). Partial repetition also supports the learning of new words. In a short word-learning paradigm, 2-year-old children only showed successful learning of novel words when exposures had been repeated across successive sentences, as opposed to distributed throughout labeling episodes, suggesting that immediate opportunities to detect recurring structure facilitate young children's learning.[77] Similar benefits of repetition have also been shown in the context of cross-situational word learning; immediate repetition of word/object pairs in ambiguous contexts seems to help infants track co-occurrence probabilities across learning events in order to successfully map labels onto objects.[78] Finally, another measure of 'repetitiveness' in CDS is the number of unique words (types) compared to the total number of words (tokens). Researchers assessed this type-token ratio in maternal speech with 7-month-old infants, and found that it predicted vocabulary scores when the children were 2 years old.[79] Together, these studies suggest that repetition in CDS improves young children's ability to find words in speech and determine the meanings of those words.

Social factors related to CDS are also likely to have an influence on young children's language learning, as infants' experiences with language occur in the context of interactions with caregivers. Kuhl and colleagues found that 9-month-old English-learning infants displayed sensitivity to non-native phonetic contrasts (i.e., sound categories found in Chinese, but not English) if they were exposed to Chinese-speaking adults before being given a phonetic discrimination test.[80] However, the ability to distinguish these non-native phonetic contrasts was diminished if infants instead watched a prerecorded video of the same adult. Social factors also support early speech production: the presence of parents in the room increases the frequency of preterm infants' vocalizations.[81] Indeed, it seems that contingency in parent–child communication is likely to be particularly important for facilitating early language learning.[82] For example, social feedback to infants' babbling has been shown to facilitate learning of phonologically complex vocalizations,[19] and mothers' responsiveness to infants' affective facial expressions, vocalizations, and bodily movements is predictive of children's language learning.[83] In addition to contingency, the transparency with which parents convey word meaning using nonlinguistic referential cues has been shown to relate to children's vocabulary outcomes.[84]

Importantly, children are not passive recipients of CDS. They play a role in eliciting CDS from caregivers. Children's responses have been shown to work together with parents' responses; they provide feedback to each other and influence each other's speech in a dynamic way.[85] A longitudinal study of parent–child interactions found that if children's vocalizations were speech-related (as opposed to laughs, coughs, or other nonspeech vocalizations), adults were more likely to respond. And children were more likely to produce speech-related vocalizations if an adult had responded to their previous speech-related vocalization.[86] Positive feedback from infants increases parents' mean pitch,[87] and mothers' and toddlers' speech patterns become more similar, particularly in measures of pitch, over the course of a conversational episode.[85] In one experiment, mothers and infants interacted through a double-video system (similar to video chat), receiving either live feedback or—unbeknownst to them—previously recorded video. During the replayed video sessions (which lacked contingent responsiveness), mothers' mean pitch height declined, and their overall amount of high-pitch talk declined.[88] Together, these findings support the idea of a social feedback loop between parents and children, in which contingent responses from infants beget positive responses from parents and lead to higher-quality verbal communication.[89]

Finally, researchers have started to characterize the extent to which infants' preferences for and ability to learn from CDS remain intact over the course of early development. Some studies show that while younger infants (4–6 months) show a preference for listening to CDS over ADS, infants older than 7 months do not.[90,91] However, infants above the age of 14 months have been shown to prefer CDS over ADS in some cases,[90,92] suggesting the existence of a U-shaped developmental preference that follows infants' decreased interest in the melodic features of CDS and their subsequent increased speech perception abilities in the context of CDS. But during the second and third years of life, the usefulness of CDS for language learning might become less important. One study showed that 27-month-old children were equally able to learn new words in both CDS and ADS.[61] Thus, infants' preference for and learning from CDS changes over time, and different characteristics of CDS are likely to be beneficial during different windows of time in the course of language learning.

In sum, this literature has revealed several important features of CDS—at the level of sounds, words, sentences, and social interactions—that influence children's early language-learning abilities. It is important to keep in mind that infants are also active participants in their own language learning (i.e., they are part of a social feedback loop with their parents), and different features of CDS are likely to differentially affect children's learning over the course of development. Overall, research on CDS has begun to narrow in on particular qualitative features of input that directly affect children's language learning. While few of these experiments have directly examined SES, determining which features of CDS differ across and within SES tiers—and which do not—may ultimately help to explain differences in children's language outcomes.

HOUSEHOLD AND COMMUNITY INFLUENCES ON EARLY DEVELOPMENT

A complete understanding of research on language learning, SES, and CDS also needs to incorporate any relevant—and potentially mediating—factors that might help explain individual- and group-level differences in language learning. A range of household and community factors are likely to influence both parents' language input and children's subsequent language development. First, research suggests that culturally transmitted knowledge and practices, such as knowledge of child development[6,93] or parental warmth/sensitive parenting,[9,94] might mediate the observed relations between SES, language input, and language learning. Second, stress or maternal depression in the household is likely to negatively influence parents' input and children's development.[11,95,96] Exposure to various forms of adversity early in childhood has been shown to lead to a toxic stress response that is particularly detrimental to successful learning, behavior, and physical and mental well-being later in life.[96] Maternal stress has also been shown to correlate with lower birth weight, which is associated with developmental delays in language-related brain regions.[95] Third, practicalities of parents' time and financial management may interact with SES in shaping children's futures. Having to deal with insufficient resources, such as money or time, requires vigilance and incessant juggling, thereby capturing mental resources at the expense of other aspects of life.[97] Many parents are encumbered by persistent demands on their time, and those with fewer demands may have more time to be physically, emotionally, and cognitively present in the home, and thus able to attend more fully to their children.

In order to understand how family life shapes children's language learning, future research will

need to examine a vast network of factors: parents' work lives (such as predictability of work hours and job satisfaction), availability of child care, sleep habits, access to health care, financial planning, organization versus disorganization of the physical and social environment in the home, and management of utilities, food, and transportation. Nevertheless, while a range of factors related to the home environment are likely to interact with SES in influencing parents' language input and children's learning, the fact that high-quality input directly affects children's language growth is important in itself. Regardless of the extent to which various life circumstances influence input and learning, parents' implementation of supportive language experiences could help buffer against developmental risk factors.

CONCLUSION

Family SES predicts group-level differences in parents' language input and children's language development. Specifically, children at the lower end of the SES spectrum tend to receive significantly less high-quantity and high-quality language experience, which affects their development of vocabulary, grammar, and language processing. The implications of these findings are a clear public health concern. In the United States alone, 14.7 million children under the age of 18 were living in poverty in 2013.[98] Yet research has shown that important differences also exist within SES groups regarding amount and quality of parents' speech to their children, and these differences relate to children's language development, even within low-SES populations. In particular, research has revealed that features of input such as lexical and grammatical diversity, mean length of utterances, and fluency of communicative exchanges—which tend to differ across children's language environments—are predictive of their language outcomes. A distinct but related line of research has narrowed in on particular features of CDS that influence children's language-learning abilities. Specifically, laboratory experiments have uncovered several prosodic, structural, and social characteristics of CDS that directly affect young children's learning. Together, these two domains of research—the relation of SES to parents' input and children's learning, and the specific features of CDS that matter most for early language learning—are beginning to reveal the mechanisms that underlie the link between input and learning both within and across SES groups. Future work will need to integrate the motivations and methods of these two domains of research in order to determine whether or not the particular features of CDS that promote children's language outcomes vary by SES. Doing so will help us better understand and intervene on individual differences in early language learning.

The interaction between SES, parents' input, and children's language outcomes is also likely to interact with two dimensions of variability: the age of the child, and the nature of the child's household and community. When in development do features of CDS most powerfully exert their influence on different aspects of language learning, and how do these processes vary across the SES spectrum? SES differences in children's language development are clearly apparent within the first two years of life,[43,94] but less is known about how specific features of parents' input differentially influence the emergence of early language-learning abilities (e.g., speech perception,[99] word segmentation,[100,101] and word learning[102,103]) across the SES spectrum. Moreover, how do family factors such as economic stress, time management, and television use constrain parents' opportunities to engage in enriching, high-quality communication with their children? Going forward, researchers should work toward understanding how specific variations in children's experiences affect their language learning across development, across the SES spectrum, and across different meta-contexts in which children live and interact. This multidisciplinary research effort will address two interrelated objectives: (1) the basic science objective of understanding how and why differences in input lead to different developmental trajectories, and (2) the translational objective of creating effective and long-lasting interventions and policies that promote children's language learning within and across SES groups.

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