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# Why Talk with Children Matters: Clinical Implications of Infant- and Child-Directed Speech Research

Nan Bernstein Ratner, Ed.D., CCC, Fellow-ASHA<sup>1</sup>

## ABSTRACT

This article reviews basic features of infant- or child-directed speech, with particular attention to those aspects of the register that have been shown to impact profiles of child language development. It then discusses concerns that arise when describing adult input to children with language delay or disorder, or children at risk for depressed language skills. The article concludes with some recommendations for parent counseling in such cases, as well as methods that speech-language pathologists can use to improve the quality and quantity of language input to language-learning children.

Keywords<sup>Q1</sup>:

**Learning Outcomes:** As a result of this activity, the reader will be able to: (1) summarize the features that distinguish infant- (IDS) or child-directed speech (CDS) from adult-directed speech; (2) list some of the features of IDS/CDS that have been shown to positively influence children's language outcomes; (3) discuss how child language disorder or delay impacts IDS/CDS and evaluate whether such changes are adaptive or maladaptive for the children's language development; (4) suggest ways in which speech-language pathologists can counsel parents on how to implement best input practices that encourage children's language development or employ these practices in their therapeutic interactions with language-delayed, language-disordered, or at-risk children because of socioeconomic factors such as poverty.

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Child Language Input and Interaction: Key Concepts for the Speech-Language Pathologist; Guest Editor, Meredith L. Rowe, Ed.D.

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More than three decades after the publication of Catherine Snow and Charles Ferguson's landmark volume, *Talking to Children*,<sup>1</sup> research continues to emerge on the impacts of changes that adults typically make when speaking with young children, or listeners with non-adultlike communication abilities. "Baby talk," "motherese," or infant- (IDS) or child-directed speech (CDS) can sometimes be the object of humor; some of us engaged in this area of research have had to read media coverage of our work with punning titles such as, "Linguist Goes Gaga over Baby Talk." <sup>Q2</sup>However, there are important theoretical as well as practical reasons why this speech register continues to attract research attention. For those scientists who seek to parse the roles of nature and nurture in typical language development, study of CDS continues to refine the debate on how much of language skill is innately specified, as opposed to learned via exposure to mature language users.<sup>2</sup> The answer to this question is of immense practical importance in understanding how better to aid infants and children whose language development is at risk because of developmental disability or restricted input (as might be seen in hearing impairment, or in children with fewer opportunities for adult-child verbal interaction).

This issue contains numerous examples of why input to children is important in helping their language development. To understand the clinical implications of what we currently know about CDS and its impacts on language development, I will first very briefly review some characteristics of the IDS/CDS register. Next, I will discuss the more relevant literature for speech-language pathologists (SLPs) and parents regarding how IDS/CDS can actually impact the features or pacing of children's language development. Finally, I will describe how the literature translates into tangible ramifications for children at risk, or those whose communication development is impaired.

### **A FAST TOUR OF THE IDS/CDS REGISTER**

CDS differs from speech shared among adults or older children across almost every linguistic and paralinguistic level of analysis.<sup>3</sup> The aspect

of CDS that most readily identifies it to listeners is its prosody, characterized by higher fundamental frequency (in most cultures,<sup>4</sup> but not all<sup>5</sup>) and expanded pitch range. Less obvious are its slower rate and selectively lengthened speech segments,<sup>6-10</sup> which have been shown to more saliently mark clause boundaries, among other cues to parsing the speech signal for the language-learning infant. The articulation of words and phrases in IDS/CDS has been described as relatively clarified in some studies,<sup>11,12</sup> but not all.<sup>13</sup> The function(s) of these acoustic modifications are still a matter for debate, although most agree that they highlight speech addressed to infants.<sup>14,15</sup> Given the other linguistic features of IDS/CDS, this highlighting function is probably quite useful in attracting the child's specific attention to input "packaged" in this distinctive way. However, the prosodic and segmental features of IDS/CDS appear to help learners: notably, adult learners of an unfamiliar language do better when given IDS-like input than adult-directed conversational speech input.<sup>16</sup> However, clinicians working with older language learners or communicatively impaired adults may need to suppress this aspect of the register, which can be annoying and demeaning when directed to older listeners.<sup>17</sup>

The structural (grammatical, syntactic) aspects of IDS and CDS are also striking and of potential help to language learners. There are a high proportion of very short (one to three words long) utterances,<sup>18</sup> a lower proportion of complex sentences, as well as a high degree of repetition and paraphrase.<sup>15</sup> The prevalence of short utterances, repetition, and paraphrase in IDS/CDS is one reason why computer simulations of language learning do very well when provided with IDS/CDS corpora to "learn" from.<sup>19,20</sup> Speech to children differs in the types of utterances that are most prevalent, as well. Parents use a much higher proportion of questions (often somewhat rhetorical) than seen in communication with adults.

Vocabulary use also differs between adult-directed speech and IDS/CDS. In general, there is a lower type-token ratio, indicating more repetition in speech to language learners. In our ongoing longitudinal study of mother-child verbal interactions from 7 to 24 months of

age, word use was most repetitive to the youngest cohort, and at that age, the higher the repetition rate, the stronger the child's language was later, at 2 years of age. Vocabulary use is also simplified (e.g., more basic category level items, fewer rare and abstract words), sometimes to the point that mothers misname items to help negotiate their child's understanding of language (e.g., calling a tiger a "kitty cat," or a Barbie doll <sup>Q3</sup> a "baby").<sup>21,22</sup> Nonetheless, studies typically find that, between 1 and 4 years of age, using more diverse vocabulary with children is better for children's vocabulary development; virtually every article in this issue reinforces this concept.

Q3

Although mothers' CDS has been studied most intensively, fathers,<sup>4,22-25</sup> other adults (including speech-language therapists<sup>26</sup> and teachers<sup>27-29</sup>), and even siblings<sup>30</sup> make marked adjustments in their speech to young language learners. The full list of properties that distinguishes IDS/CDS from adult-directed speech could take a full volume of this journal to describe. However, even in *Talking to Children*, contributors realized that the larger challenge of research in IDS/CDS is to identify if and how such speech adjustments impact the child's language development. In this next section, I review major findings that have ramifications for practicing clinicians.

### HOW INPUT AFFECTS CHILDREN'S LANGUAGE LEARNING

The first major finding that is widely replicated and important for clinicians and parents to understand is that the quantity of CDS is highly predictive of child language learning outcomes.<sup>31,32</sup> Importantly, it is the speech that is used in interaction with the child, rather than simple exposure to language in the environment (overheard language directed to others, television, etc.) that predicts such language growth.<sup>33-35</sup> Moreover, the quality of parent-child verbal interaction is much more important to child language growth than any "baby improvement" programs.<sup>36</sup> Such programs primarily show benefits only when parents interact with their children during viewing.<sup>37</sup> In this sense, TV and videos function best as "talking books,"

rather than as substitutes for actual parent-child interaction.

More specifically, there are now abundant data to show that patterns of children's vocabulary development can be directly related to profiles of their parents' language interaction with them.<sup>38-42</sup> Furthermore, we are now able to show that aspects of parental syntactic input facilitate mastery of the child's grammatical development.<sup>43-47</sup>

Not all aspects of parental input are mirrored directly in the child's language acquisition in the sense that more of one behavior leads directly to more of the same feature in the child's speech. There are some very important relationships between input profiles and children's language development that might not seem apparent on first blush. In *Talking to Children*, Newport, Gleitman, and Gleitman discovered that the frequency of mothers' questions in CDS was associated, not with the mastery of questions by their children, but with mastery of the verbal auxiliary system.<sup>48</sup> This actually makes sense, if one considers that questions highlight verbal auxiliaries in the first position of utterances ("Is the dog barking?"), particularly because parents have a highly predictable way of answering such questions with equally salient final usage of the target auxiliary ("Is the dog barking? Yes, he is!").

Not all input characteristics appear to facilitate language. In particular, Newport, Gleitman, and Gleitman found that maternal usage of imperatives, a form of directive language, was negatively associated with aspects of children's language development, specifically elaboration of subject-noun phrase components. Again, this makes sense if we consider that, structurally, imperatives delete subjects. Pragmatically, they also "shut down" conversation, unlike questions, in the sense that they do not invite the child to respond or contribute verbally. Since these early findings, researchers have examined directive language in more detail, distinguishing between types of directives. Although some forms of maternal directives, such as those that facilitate the child's engagement in ongoing activity or interests, have been associated with better child language outcomes,<sup>49</sup> directive language that changes the

child's focus, or has the primary goal of directing or managing the child's behavior, has generally been associated with slower pacing of child language development.<sup>50,51</sup> Such findings have durable implications for counseling of parents whose children are communicatively disordered or delayed. Studies have shown that parents tend more often to manage these children's behaviors through greater use of imperatives.<sup>52,53</sup> This may be because children with more limited language do not understand indirect requests for action, or longer, more complex utterances. However effective directives may be in getting the child to respond behaviorally, a disproportionate use of directives may be a strategy that limits the child's access to more helpful language input, as well as diminishes opportunities for verbal interaction.

In all the research into the role that input plays in child language development, the most attention has been paid to mothers. However, a growing literature explores the role of fathers<sup>23–25</sup> (including the work by Guest Editor Rowe and her colleagues in this issue), teachers,<sup>27,29</sup> day care providers,<sup>54</sup> SLPs,<sup>26</sup> and even nannies.<sup>55</sup> In general, findings are congruent with those found in examining the role of maternal input to children, with a few notable exceptions. Fathers appear to provide children with somewhat more demanding vocabulary input, which may help to bridge their ability to transition between the finely tuned styles of mothers and the “real world,” and further enrich children's vocabularies.<sup>22</sup>

Language input from teachers and child care providers, while potentially enriching of children's own linguistic skills, tends to be somewhat unbalanced in its opportunities for children themselves to talk; the adults in these contexts tend to dominate the verbal interaction. In addition, language used to manage children's behavior in group settings is less facilitative of language learning, just as in parent-child interaction,<sup>56</sup> and many group environments do not provide optimal contexts for the adults to be responsive to the child's language and interests.<sup>28</sup> Providing more opportunities for the children to engage communicatively would be even more enriching, which may be just one of the many reasons why child care environments with higher adult-child ra-

tios are not as facilitative of children's development as home-based care or settings with low adult-child ratios.<sup>57</sup>

Finally, a great deal has been learned about the contexts in which parental input appears to facilitate children's language best. Input is most helpful to children's learning when it accompanies joint attention to objects or activities (that is, occurs when the parent and child are mutually engaged, rather than when the child's attention is directed elsewhere), and follows the child's lead rather than redirects it. These two considerations relate directly to some of the clinical populations that we work with. Children with ASD<sup>Q4</sup> or some cognitive impairments will require prerequisite training of parents, or direct intervention with the child to elicit joint attention for language input to be mapped effectively by the child. In addition, child behavior or inattention that elicits a more directive style from parents, caretakers, or therapists will interfere with efforts to let the child lead conversation.<sup>58</sup>

Q4

## CHILDREN WITH SPECIAL CONCERNS REGARDING INPUT AND INTERACTION

### Late-Talking Children and Children with Specific Language Impairment

Although many parents of children with language impairment are quite sensitive and supportive of their children's level of linguistic skill during interactions,<sup>59</sup> other research has found aspects of adult language interaction with such children to be altered in ways that are potentially unhelpful to the child's language growth.

For instance, young children with SLI<sup>Q5</sup> may receive fewer recasts (paraphrased and/or expanded feedback of the child's own speech) than typically developing children<sup>60,61</sup>; even research that has not found this pattern points out that children with SLI may require even more recasts than typical children to “grow” their language.<sup>62,63</sup> Parents may “strip” their language down to make it more “telegraphic” (sometimes under the advisement of the child's therapist), a tendency that may aid the child's comprehension, but probably has detrimental

Q5

impacts on their expressive language skills;<sup>64,65</sup> a survey of actual CDS to language-impaired children showed that the very morphemes most of them find most difficult to acquire are actually seen less often in their adult-provided input than in speech to other language learners.<sup>66</sup> As with the other populations discussed later, individual parent-child dyads differ in their characteristics, and more work in this area is clearly needed. However, the complexity of the problem is highlighted by an interesting case study in which both simplified and expanded (grammatical) input was used with a language-delayed toddler. Vocabulary comprehension was helped by simplified input, but the child was more verbal in interactions using more expanded adult language.<sup>67</sup> This case illustrates the trade-offs that can occur between everyday needs of interaction and long-term outcomes.

### Hearing Impairment

There is a large difference between the kind of input that functionally deaf children receive as opposed to those children with cochlear implants (CIs). As noted in a recent review,<sup>68</sup> a long-standing problem in intervention is the degree to which input to deaf children is hampered either by the child's lack of ability to fully process information presented in the auditory/verbal mode or adults' abilities to provide full or nativelike manual or manually augmented input, because most parents of deaf children are not native users of sign languages or sign systems. Because so many children now receive CIs, I will focus on this population, in part because it is sometimes erroneously assumed that a CI places the child on a typical footing with normal-hearing peers in terms of accessibility of the input.

Children with CIs appear to receive generally equivalent input to children with normal hearing; however, in a small study, their language progress was correlated with the number of adult-child conversational turns, rather than sheer amount of input,<sup>69</sup> suggesting that reciprocal interaction is more helpful than simple input. The largest study to date that has examined parental use of strategies that are documented to assist children's language learning

(including parallel talk, expansions, and recasts, in addition to measures of input frequency) found strong relationships among parents' use of such input features and the child's subsequent language skills.<sup>70</sup> The multicenter study followed almost 100 families of preschoolers who had been implanted before 2 years of age and emphasized the value of targeting such input features in early intervention programs, because not all parents appeared to be aware of "best input practices" for their at-risk children. To further emphasize the critical nature of input quality, another recent study found the quality of child-directed input to be even more predictive of language outcomes than did age of implantation (a proxy for years of exposure to language).<sup>71</sup>

Most of these studies, as well as others referenced elsewhere in this article and issue, also highlight the bidirectional nature of all adult-child verbal interaction. The child's own language abilities, and responsiveness to the parent's conversational gambits, which can be reduced by even small decrements in hearing that might be seen in chronic otitis media,<sup>72</sup> exert a powerful influence on the linguistic and paralinguistic richness of input directed to the child. It is exactly this relationship that is an important focus of counseling: understanding how parents need to balance the difficult challenges of maximizing the child's ability to comprehend input, while assuring that input is rich enough to lead the child further in language development.

### Brain Injury

Guest Editor Rowe has conducted the most recent large-scale study of interactions between maternal input and language development in children with early brain injury (BI).<sup>73</sup> Between roughly ages 1 to 4 years, while richer maternal input affected vocabulary development equally in children with BI and their typically developing peers, syntactic complexity of maternal input more strongly predicted syntactic growth in the BI group. Such findings highlight the value of counseling parents of all children at developmental risk on how to use language-facilitating patterns of input.

### COGNITIVE IMPAIRMENT

A classic study by Rondal suggested that when matched for language age, children with Down syndrome received roughly the same level and type of input as did typically developing peers.<sup>74</sup> More recent work by Iverson and colleagues, matching for cognitive level of development, concurs<sup>75</sup>; the end result is that children with Down syndrome tend to hear shorter, simpler utterances than age-matched peers, which are more likely to be accompanied by pointing or gesture. Children with cognitive impairment are also likely to hear more directive speech than typically developing children.<sup>76</sup> Other studies have suggested input that is richer in vocabulary characteristics than in syntactic fine-tuning. A very recent study found simpler patterns of vocabulary input than observed in either vocabulary- or age-matched comparison groups, with additional syntactic/pragmatic differences, such as a lower rate of adult imitation of the child's language attempts.<sup>77</sup> In sum, cognitive impairment limits some aspects of input that children are exposed to.

### STUTTERING

Readers might be surprised to see this population discussed in the context of parental input, because children who stutter are not overtly at risk for language impairment (even though a growing body of literature has identified subtle linguistic processing problems in people who stutter across the lifespan). However, an old tradition spawned by Wendell Johnson's diagenetic theory of stuttering has led to innumerable parent counseling advisements that target changes in how parents speak to their children who stutter. Even today, it is common to see websites and even speech-language pathology textbooks recommend that parents slow and simplify their speech to young children who have recently begun to stutter.<sup>78</sup> The original premises behind such recommendations were twofold: first, to try to improve the child's fluency without calling the child's attention to his speech (so called "indirect" therapy, to avoid "diagnosing" the stuttering and thereby worsening it), and second, to induce changes in the child's speech that might be more facilitating of fluency (such as slowed rate and simpler language).

However, over the years, although research has affirmed old research impressions that children stutter more when attempting to say linguistically more complex utterances,<sup>79</sup> virtually no research suggests that children match their parents' linguistic or rate models. Parents' speech to children at stuttering onset appears well matched to their linguistic skills,<sup>80</sup> as do their perceptions of the children's relative language skills. In fact, the single experimental study in the published literature that examined toddlers' fluency responses to both slowed and simplified maternal input showed an *increase* in disfluency, and no changes in the children's rate or language behaviors.<sup>81</sup> Thus, no evidence supports the effectiveness of simplified parental speech on children's disfluency, whereas a large body of data substantiates how critical a large, diverse, and sufficiently complex parental language model is to children's language development. This seems to be a case where much is known about the trade-offs between differences in the richness of parental input and the absence of evidence that supports any efficacy of recommendations that parents simplify their speech to children who stutter.<sup>82</sup> Moreover, the concern that direct therapy for children's stuttering causes the problem to worsen or become chronic has been directly contradicted by numerous studies of preschool stuttering therapy such as Lidcombe and a variety of parent-child interaction-based therapies. Simply put, advisements to simplify speech to young children who stutter appear poorly motivated and potentially harmful to their language development.

### CHILDREN IN FAMILIES OF LOW SOCIOECONOMIC STATUS

More than one-fifth of school-aged children in the United States live below the poverty line, according to the National Center for Education Statistics (report available at <http://nces.ed.gov/programs/coe/>). Children from homes of low socioeconomic status (SES) are disproportionately represented on special education case-loads, and it is possible that the impacts of both disability and home environment are additive. The role of adult input to children raised in poverty has begun to attract increased attention; the gap in vocabulary achievement between

such children and peers from more advantaged homes is particularly sobering, as Hart and Risley were the first to show.<sup>83</sup> Although individual variation is seen in low-income maternal language use,<sup>84</sup> mothers in lower-SES households tend to be more directive,<sup>85</sup> and they generally display patterns of input that are considered less facilitative of children's language development,<sup>86–88</sup> including less enriched vocabulary,<sup>89</sup> even during language-enhancing activities such as joint book reading.<sup>90</sup>

How does SES impact the nature of input to young children? There seem to be many reasons why input to children in lower-SES households does not appear as “enriched” as that in upper SES environments. Maternal education level, typically lower in low-SES households, is a major source of variation in motherese features and children's subsequent language development.<sup>84</sup> Maternal education also affects how well mothers appreciate the role of their language interactions in furthering children's language development.<sup>91</sup> Parental depression, also elevated in low-SES families, additionally contributes to profiles of input,<sup>84</sup> and has been independently associated with lower language outcomes in children.<sup>92–94</sup> Poorer households may also be characterized by disorganization in the nature of everyday activities that influence the quality of parent–child verbal interaction,<sup>95</sup> and lower-income parents are more likely to have their children in lower-quality child care and preschool settings.<sup>57,96,97</sup> On a more positive note, intervention programs and counseling parents on the types of verbal interactions that help children learn language have good documented outcomes.<sup>98,99</sup>

#### PROGRAMS TO ALTER PARENT–CHILD INTERACTION PROFILES

Another contribution in this issue (by Leffel and Susskind<sup>Q6</sup>) addresses the Thirty Million Words project, one of several intervention programs primarily focused on fostering parental input to children at risk for language problems. For SLPs, perhaps the best-known program that has been used to tutor parents in more facilitative use of language with their at-risk children is the Hanen It Takes Two to Talk and More Than Words ([www.hanen.org](http://www.hanen.org))

programs. As summarized on their website, the It Takes Two to Talk program teaches parents, teachers, and caretakers to:

- Recognize the child's current linguistic level to tailor input that is appropriate to the child's abilities and needs
- Identify contexts in which the child is motivated to communicate
- Increase turn taking during interactions
- Follow, rather than direct, the child's interests during interaction
- Enrich the language input the child hears
- Use joint book reading to augment contexts for child language learning
- Fine-tune language input to maximize the child's understanding of language and vocabulary

Effectiveness of the Hanen and similar approaches has been documented in a handful of studies, including use with children having ASD or developmental motor impairments.<sup>100–103</sup> However, it may not be more effective than more traditional therapy and parent–counseling approaches that make use of these concepts, all grounded in the literature discussed earlier in this article.<sup>104</sup> A major appeal of Hanen is the degree to which parent training has been systematized and augmented with teaching materials and therapist support to help parents master the concepts; the concepts themselves are not novel. Although not as widely known, other parent-focused interventions have also been able to document success in fostering children's language development, such as Parent–Children Interaction Therapy.<sup>105</sup>

#### FOCUSED STIMULATION AND OTHER CLINICAL APPLICATIONS OF CDS RESEARCH

Clinician and parental use of focused stimulation identifies particular structures (words, grammatical targets, etc.) and uses them intensively within adult–child interactions to literally bombard the child with input relevant to the language goal. Its major principles are repetition and paraphrase of language targets to accompany the child's actions

Q6

or interests. The principles of focused stimulation are consistent with the literature discussed earlier on aspects of adult language that are likely to be helpful to language-learning children. Focused stimulation has been shown to be effective in improving children's language skills.<sup>106-108</sup>

### **PARENT-CHILD AND CLINICIAN-CHILD BOOK READING**

In addition to language shared in conversations between parents and children, involvement in joint book reading between parents and children can positively impact children's early language development.<sup>109</sup> Interventions to increase the quantity and quality of adult-child interactions involving books show positive language outcomes,<sup>99,110</sup> and can be a useful framework for counseling parents on structural and pragmatic features of input that tend to be associated with gains in child language. For children with specific speech or language goals, there are resources that identify specific preschool books that provide focused stimulation for potential therapy targets.<sup>111</sup>

### **INTEGRATING THE RESEARCH: CLINICAL IMPLICATIONS**

First, some caveats. There is much yet to learn about ways in which adult input impacts the language development of typically developing and at-risk children, and surely individual differences in adult-child dyadic interaction create differences in how children best exploit their language environments to learn. Furthermore, in the limited space here, one can only touch on the rather large literature that has tried to address these concepts; this review should be considered illustrative of past findings, but not in any way exhaustive. With these cautions in mind, in general, a somewhat unhappy profile can emerge when we look at the typical impacts that language delay or impairment have on the very language input that has the potential to further language development. In a sense, the rich are likelier to get richer, and the poor are likelier to become poorer. Children with poorer language skills receive less input from adult conversational partners.<sup>28,58</sup> The child who

has poorer comprehension skills or who has trouble engaging in joint attention with others is likely to be the recipient of more directive language, as are children with accompanying behavior problems. More than half of all U.S. children on caseloads for treatment of language difficulties, including those stemming from hearing impairment and cognitive impairment, come from households in which English is not the primary language, and many of these children live in families having relatively lower SES. Both of these contexts are characterized by their own substantive negative impacts on profiles of input to young language learners and resulting language skills in these children. Taken together, these facts suggest that clinicians working with the birth-three cohort<sup>Q7</sup> and developing Individualized Family Service Plans should explore ways in which parents and other child care workers can understand the importance of the language they share with young children and work to maximize the quantity and quality of input. Although structured parent training programs offer one approach, some simple suggestions can go a long way in enriching the child's language environment: maximize opportunities for joint attention; talk about what the child is doing, seeing, or interested in; respond to and expand the child's communicative attempts; and engage the child in conversation as much as possible. Add books and opportunities for joint book reading, and you have a very good start on helping young children to maximize their language learning potential.

**Q7**

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