Language Development and Down Syndrome:
A Child Case Study

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Language Development and Down Syndrome

Abstract

Language is a specific difficulty for children with Down syndrome. This may be due to physiological factors like hearing problems, low muscle tone and a small mouth cavity compared to tongue size. It is also linked to cognitive problems like attention, memory and retrieval. The current study is based on direct observations of a 7 ½ year old girl with Down syndrome. It is enriched by the observations and opinions of her mother, speech therapist, classroom teacher and resource teacher. Topics addressed include the importance of nonverbal communication, the use of sign language, the transition to verbal language, the effects of placement in a mainstream classroom, the role of parents in language learning and the effects of learning to read. These are ultimately tied back to the strong social motivation in children with Down syndrome and the specific achievements of the specific child in the case study, C.L.
Language Development and Down Syndrome: A Child Case Study

One night while I was cleaning up after dinner, C.L. came up to me with her eyes down and her shoulders drooping, holding an empty little blue plastic cup. She gathered her composure, took a breath and said, "You spilled," with a sheepish sound in her voice. It took me a second to understand what was going on, knowing that she was holding her own empty cup, but I realized that she was having the same problem with pronouns that many young children have. What she really meant was that she spilled. Making that mistake is certainly not unique, but C.L. was 5 years old and most typically developing children were past the pronoun milestone at that point. Despite that fact, C.L. seemed quite ahead of her peers, for a 5 year old with Down syndrome, specifically, her speech was quite ahead of schedule.

What is Down syndrome?

Down syndrome is the most common genetic cause of mild to moderate mental retardation, spanning both genders, and all races and economic groups, according to the National Institute of Child Health and Human Development (2005). It occurs in about 1 out of every 800 live births. It is caused by an extra 21st chromosome, called "trisomy 21." Down syndrome is named after the first physician to identify it, John Langdon Down. As far as current research has shown, Down syndrome cannot be attributed to any parental behaviors or environmental factors, as the chromosomal anomaly is laid out at conception, but we do know that in 88% of children with Down syndrome, it is their mother who contributes the extra copy of the 21st chromosome. Rates of Down syndrome also increase with mother's age.

Common features of a person with Down syndrome include "a flat facial profile, an upward slant to the eye, a short neck, abnormally shaped ears, white spots on the iris of the eye (called Brushfield spots), and a single, deep transverse crease on the palm of the hand"
(NICHD 2005). But these features are not common to all people with Down syndrome, and many can be found in the general population as well. Often people with Down syndrome have a protruding tongue, vision problems, hearing loss and low muscle tone. As with all children, the rates of development and level of ability vary greatly in children with Down syndrome and it is impossible to say what one particular child is capable of (NICHD). It is possible that with proper intervention as few as 10% of people with Down syndrome would be classified as severely mentally retarded (March of Dimes, 2006).

There are many behavioral phenotypes associated with the extra 21st chromosome. Individuals with Down syndrome often show a relative strength in imitation, visuospatial processing and social functioning, with deficits in verbal processing, specifically expressive language, and motor skills (Fidler, 2005). Students with Down syndrome are often included in mainstream classes, although those with more significant needs may be placed in specialized programs. Some people with Down syndrome graduate from high school and go on to post-secondary education. Many adults with Down syndrome are fully capable of employment, although some require a very structured environment (National Association of Down Syndrome, 2005). Most adults with Down syndrome are capable of basic daily living skills like feeding, washing, dressing and toileting (Carr, 2000). More and more adults with Down syndrome are living semi-independently in group homes where they take care of themselves and participate in community activities. Adults with Down syndrome can marry and have children. There is no cure or prevention for Down syndrome (March of Dimes, 2006), but early intervention may be key to the full development of all possible skills and goals. People tend to have positive perceptions of people with Down syndrome, noting that they are “affectionate,” “cheerful,” and “fun,” (Fidler, 2005).
There is a strong connection between Down syndrome and language skills. Some children with Down syndrome may actually begin speaking at about the same time as typically developing children, although their rate of acquisition is slower (Berglund, Eriksson & Johansson, 2001). Many children with Down syndrome begin using sign language and then transition to spoken language (Bryen & Joyce, 1985). Vocabulary is a relative strength in children with Down syndrome, and when matched with partners of comparable linguistic skill, we even see greater diversity of verbs in children with Down syndrome (Grela, 2002). When compared to children with a similar vocabulary size, children with Down syndrome frequently have fewer grammar and pragmatic skills and often speak in shorter utterances. Contrary to popular belief, children with Down syndrome are able to speak about abstract topics or absent subjects, they are just slower to develop that skill. C.L. is quite an abstract thinker, predicting the future for her dolls, and speculating the origins of spaceships. This is a general finding: that there is no linguistic skill that a person with Down syndrome cannot achieve, it is just that they take longer to achieve such skills. In fact, researchers say, “Children with Down syndrome are mainly delayed and only marginally deviant in their language skills,” (Berglund, et al., p.189).

Methods

The present study attempts to look at the broad body of research in the field of language development and Down syndrome and apply it to one child. C.L. is 7½ years old and was diagnosed with Down syndrome shortly after her birth. She has received almost 7 years of formal education, beginning with developmental therapy at 6 weeks of age, and now she is in a mainstream first grade classroom with the help of an assistant. Direct observations of C.L. have been occurring for the last five years, becoming more frequent and focused in the last
month. These observations are supplemented by interviews with important adults in her life: her mother, her speech therapist, her current classroom teacher and her resource teacher. The semi-structured questions used in the interviews can be seen in the Appendix. Together, these interviews and observations have been compared to the results of other scientific inquiries to try to give a human quality to the issue of language development in children with Down syndrome.

*Why is language more difficult for C.L. and other children with Down syndrome?*

Many of the language difficulties for people with Down syndrome may be physiological. Both C.L.'s mom and speech therapist noted the typical smaller mouth and larger tongue often seen in people with Down syndrome could make articulation more difficult. They also both mentioned that hypotony, a condition of low muscle tone that often affects the ability of the mouth, tongue and cheeks to make precise movements, is common in Down syndrome. This can also cause problems with muscle coordination, an important skill in speaking. Many children with Down syndrome have problems with their hearing (NICHD, 2005). This may mean that, if those problems go undiagnosed, they are not receiving proper language input.

Beginning as early as 22 months, children with Down syndrome often have a difficult time sharing their ideas about activities in which they are currently engaged because it is difficult for them to attend to communicating and playing at the same time. It is also difficult for them to pay attention to two communication partners at once, a skill that comes easily to young typically developing children (O’Neill & Happe, 2000). C.L.’s speech therapist, T.W. noted that, at a young age, often children with Down syndrome need commands or other communication repeated several times and require longer processing time. T.W. says, “Their
response time might be different, like I might do something that they think is funny, but it takes two seconds for them to laugh. That depends on where the child may be cognitively, but it takes time to process.” That lag time may be partially accounted for by the time it takes to shift attention. Patience is important because getting a child to attend to your speech and the objects or actions you are referencing plays an important role in their language learning (Legerstee, Varghese & van Beek, 2002). Memory is often a problem, as well. Children with Down syndrome have a disproportionately short auditory short-term memory span when compared to their mental age (Seung & Chapman, 2004). This can make it hard to understand others’ speech and formulate responses (Brock & Jarrold, 2005). Auditory short-term memory is an important skill, and can be used as a predictor of eventual linguistic achievement (Chapman, Hesketh & Kistler, 2002).

There may also be a more elusive cause called “apraxia” which may also be referred to as a deficit in “verbal motor planing.” T.W. explains this as a problem with getting information from the mouth to the brain. She says that scientists do not know what causes it but that she often sees children with Down syndrome getting frustrated because they know what to say; they just cannot say it. C.L.’s mom C.J. and resource teacher S.R. also echoed this sentiment, both describing a vague problem with the translation of ideas to verbal production.

The Importance of Nonverbal Communication

Language stimulation cannot begin too early for children with Down syndrome. It has been shown that the earlier the intervention begins, the better the child’s language skills are later in life (Sanz Aparicio & Balana, 2002). C.L. began early intervention at 6 weeks and speech therapy at 6 months, well before she was able to speak, but early pre-linguistic focus often falls on non-verbal communication.
Gestures and looking behaviors constitute a lot of a child’s communication before they acquire spoken language and are also an important foundation on which language development rests on (Mundy, Sigman, Kasari & Yirmiya, 1988). When C.L. first began her early intervention therapy, nonverbal communication was a major area of focus. C.L.’s speech therapist T.W. said, “More of our communication is through our nonverbals, whether it be facial expression, pointing, or hand leading. If a child is not able to communicate nonverbally, chances are they are not communicating verbally.”

This philosophy generated a lot of creative strategies T.W. would use to get C.L. to gesture. To motivate C.L. to participate, she used something C.L. was interested in...food. She explains, “For C.L. I would put pretzels in a closed, clear container, put the lid on really tight and set it on the table so she can’t open it. What do you do? One thing is to present things that are really motivating where the child has to ask for help.” She would also put things C.L. wanted up high where she could see them but not reach. That way, if C.L. couldn’t say that she wanted it, she would point or reach for it. The physical act of pointing is sometimes difficult for the children with Down syndrome that T.W. works with due to low muscle tone and poor fine motor skills. In order to work on that, sometimes they will pop bubbles and that promotes pointing of the index finger. T.W. explains, “That way you are having fun popping bubbles and are teaching them how to point. It’s all about manipulating the environment.”

Mundy, Sigman, Kasari and Yirmiya (1988) found that children with Down syndrome have a relative strength in nonverbal social interaction skills when compared to their other cognitive skills although they have a difficult time with requests for objects and requests for help with objects. This difficulty is not found in non-Down syndrome mentally retarded children and is highly correlated with expressive language skills. Because those expressive
skills are often a later area of difficulty, non-verbal object requesting may be an effective early intervention.

T.W. uses a variation of the Picture Exchange System, often used with children with autism, to aide in gesture and requesting. Before a child comes in for therapy, she will pre-select several options for activities. She puts the pictures of these activities up on a board and lets the child point to the one they want. In C.L.'s case, she would put up pictures of pretzels, fish crackers, the doll house, and other favorite play activities. By letting C.L. choose, she was exercising gestures as well as learning that she had some control over her environment. When she made her choice, they would take the picture and put it on a sentence strip that says, "I want ____.” and try to practice saying it. T.W. sees this as a far better system than just taking everything out and allowing them to go to the activity they want because then they don’t really have to communicate. Using the pictures forces them to signal their intent because they need help from the therapist.

When children with Down syndrome are matched with typically developing children by the size of their vocabulary, we often see that the children with Down syndrome have better skills in gesturing. It is possible that this difference is a function of age, as children with Down syndrome are usually older than typically developing children who have comparable language skills and have more experience with gestural communication (Caselli, Vicari, Longobardi, Lami, Pizzoli & Stella, 1998). But strength in gestures may favor children with Down syndrome because they need to use gestures more in communication. The children in Caselli et al.'s sample mostly used gesture to communicate about things implying more advanced cognitive skills, namely “symbolic communicative gestures, pretending gestures, and actions which involve an ability to perform symbolic transformations” (p.1132). These abstract topics
are difficult to address in spoken language, and may be easier for the language-delayed to act out.

Chan and Iacono (2001) also looked at gesture and word production in children with Down syndrome. They found that an increase in gestural production usually preceded the use of spoken language. This indicates that practicing gestures and nonverbal communication may facilitate speaking because they motivate communication and provide practice in interaction.

T.W. and other speech therapists use gesture as a way to gauge receptive language. Before even attempting to produce speech, it is important to know that the child can understand it. She says, “If you say ‘get the banana.’ And they don’t know that the word “banana” is associated with a banana then you are not going to get them to say banana.” In T.W.’s therapy, she knows that children are ready for expressive language when they have achieved receptive language. “They are following commands, they can point to body parts, they pick out common objects, point to pictures in books. Then you know they have some type of baseline understanding of language.” This baseline understanding was a relative strength for C.L., who picked up on word meanings quickly. This enabled her to respond to questions or demands nonverbally.

T.W.’s knowledge of C.L.’s understanding was heavily informed by this nonverbal communication.

Sign Language

For many children with Down syndrome, sign language is used as a precursor or supplement to speech. Researchers Bryen and Joyce (1986) have found that sign language is used because it bypasses the problems with the enlarged tongue that result in unintelligible speech, and it also works with the relative strength in visual over auditory skills. It is easier to teach signs because the child can see them and their hands can be molded into the proper
shape, while sound production is an abstract and difficult to replicate phenomenon. There is also some evidence that signs with iconic value may be easier to learn because the child can associate the sign with an attribute of the referent. An example of this would be the sign for “pretzel,” in which the fingers are wound around each other and resemble the twists of the pretzel (Bryen & Joyce).

Bryen and Joyce (1986) found that in order to become a successful signer, there are prerequisites to be met. Problems with low muscle tone can make gross and fine motor skills difficult for children with Down syndrome. To use sign language, they must be able to have enough control to execute the very precise positions and movements of the signs. In addition to the physical ability, there also has to be social desire and a willingness to interact with others in responding to and initiating communication. If these things are not in place, then perhaps that is where intervention should first be directed. The learner is not the only person who needs to be assessed before sign language is used as their appropriate language intervention. The attitudes of significant others as well as their competence in using sign language are important. Having significant others who are uneasy using sign language results in less signing in front of them, and a small sign vocabulary of the teacher may result in slower learning of the learner.

At 6 weeks, when C.L. first started Early Intervention therapy, she was immediately introduced to sign language. Her first developmental therapist would visit her house once a week, and she would sign to her during their interactions. There was never doubt on behalf of C.L.’s mother that sign language was the appropriate route for her. C.J. actually did not know that her daughter would have Down syndrome until she was born. C.J. said:

You’re dealing with so many other things at that point, especially when you don’t know that you are going to have a child with special needs. You are dealing with so many
emotional issues that when those (communicative issues) come into play you just don’t have time to think about it. When you have a child with Down syndrome and you’re not expecting it, your core is just totally shaken and you go into survival mode.

C.L.’s therapist explained to her mother that sign language would help her communicate despite her low muscle tone and enlarged tongue. She immediately agreed to sign language therapy.

The first sign they used with C.L. was “more” and as she got older they incorporated relevant signs like “eat” and “drink.” At 6 months of age, C.L. switched to group developmental therapy and her individual speech therapist, T.W. The therapist says, “In C.L.’s case, she understood a lot of signs so I went with that to help with her verbal skills. With some kids I use more pictures. Kids with Down syndrome often use signing as their main source of communication, at least in my experience. I think the verbal piece is very difficult for some of these kids.”

At about 1 year of age, C.L. first started to use the signs herself. Her mom C.J. remembers her surprise at C.L.’s first birthday party when she had finished her cake and signed the word for “more.” These signs were very successful with C.L. because they were, in a way, self-rewarding. If she received food or a drink when she signed them, then she would be encouraged to use them again because she got what she wanted. When she started the Parent-Infant Intervention program at 6 months old, they would have snack time between sessions, and that was when they used more specific signs like “cookie” and “cracker.” She picked those up particularly quickly. T.W. says this of C.L.’s eventual sign competence, “I always remember C.L. for this, I could do this [Signs ‘I want more fish’] and she would say ‘I want
more fish!' She knew so many signs, so instead of me always having to say 'say this' I could give her a prompt of the sign.”

To help C.L. master the actual production of the signs, T.W. would mold her hands into the shape of the sign, a strategy used frequently with young children with Down syndrome, although one that is not often seen in deaf parents teaching signs to their deaf children (Clibbens, Powell & Atkinson, 2002). This molding may be more necessary for children with Down syndrome because of their problems with fine motor skills.

Signs were always presented to C.L. with their linguistic equivalent. For instance, in therapy sessions parents would sing songs to their children while simultaneously signing. The only exception to this was when signing was eventually used as a prompt to speech. C.L. first began using spoken words like “no” and “mama” between 18 months and 2 years old, and to get her to use manners or encourage speech, signs were used. For example, if C.L. approached her mom and said, “juice” then she would respond verbally “What do you say?” while signing, “please” without saying it aloud. When C.L. was about 2 years old, she could say several animal names. She particularly identified a stuffed cow from the toy box and would volunteer the word “cow” meaning that she wanted to play a throwing game with it. She did not use signs at all in these interactions, perhaps noticing that her playmate was not signing to her.

Often children with Down syndrome have a problem with joint attention, which is attending to what their social partner is referencing. An example of joint attention would be following a gaze or point to an object. Problems with joint attention can impede perception and learning of signs (Clibbens, Powell & Atkinson, 2002). The fact that C.L.’s therapist and mom both used words in conjunction with signs helped to draw her attention so that she could perceive both the sign the adult was making and the object to which it referred. Clibbens, et al.
found that speaking and signing together capitalizes on the typical strength in visuo-spatial skills found in children with Down syndrome and uses that to draw attention to the spoken words.

The Transition to Verbal Language

Since the beginning of therapy, T.W. had been working with C.L. on imitation and sound production. She recalls “having her imitate different vowels like “aa” “oo” “ee” and then pairing them within words.” By about age 3, C.L. could use speech and signs to answer some questions, for example, those about color. She would use both sign and attempts at speech simultaneously. In C.L.’s first year of preschool when she was about 3 ½ years old, she was in a class of non-verbal children, and she was the most articulate one in the classroom. She used signs there because that was what her peers were doing, but she would only rarely use them at home. The next year she was in a more advanced class with kids who were more at her level and she dropped the signs altogether in favor of speech.

In Bryen and Joyce’s 1985 meta-analysis of 43 studies of language development and Down syndrome, they found that fears that sign language delays the onset of speech are not supported. Sign language showed on the whole, as it did for C.L., to be a way that pre-speech children with Down syndrome can communicate until they are ready to use verbal language. T.W. also thinks “they learn better when you present things in several fashions. Like have a picture of pretzels, real pretzels, and maybe sign it too.” That presentation in different modalities can also give kids options and allow for their strongest encoding skills. Therefore, a child who has good memory for pictures will remember the word with the picture, while a child who has good motor skills will remember the word with the sign, etc.
Eventually the sign language prompts were removed, and C.L. was expected to respond to “What do you say when you want more?” With a verbal “please.” T.W. advocates this stepping up of demands, “I try to change my therapy sessions so that if a child attains a goal, you put more demands on them and you pull away the physical prompts.”

She finds that with children with Down syndrome, sometimes you just have to be patient for their word acquisition. She explains that many of them are later in crawling and walking, so expecting them to produce or even understand verbs like “walk,” “run” or “jump,” may be unrealistic until they can actually do them.

In order to reinforce and motivate speech, T.W. uses toys and activities the children are interested in and rewards them for progress. This can capitalize on the social motivation usually seen in Down syndrome. She says, “I tend to see that children with Down syndrome like praise, whether it be verbal, clapping or smiling.”

*The Inclusion Debate Regarding Language*

Debates over the benefits of inclusion often center on whether life skills or academic skills are more important for children with special needs, but behind that more visible debate, one can also question how language is affected by the decision to place a special needs student in a mainstream classroom. C.L. was in special needs preschool classes from age 3 to 5. When she turned 6, she was placed in a mainstream kindergarten class with an aide and is now continuing in a mainstream first grade class with a full-time aide, leaving the classroom for short periods of time for special reading and math classes. When asked how placing C.L. in a mainstream class has affected her language skills, her mother says, emphatically, “Immensely. Mimicking is how she has learned everything that she does.”
In that sense, being around more verbal children has allowed her to mimic more advanced speech. In C.L.'s first special needs preschool class, she was the only verbal student, but because of her mimicking skills, she would still use sign in class because that was what the other children were doing. At home she would use a combination of sign and speech. The next year, when she was placed in a more verbal classroom, she dropped the sign altogether, presumably in part because there were no other signers to mimic.

Hwang and Windsor (1999) looked at the use of imitation by children with Down syndrome and typically developing children who were matched to the same length of utterances to see the role that imitation played in spontaneous language usage. On the whole, the children with Down syndrome did less expansion of the imitations they made than typically developing children do, which means that it is important that they be around others who are making more complex verbalizations in the first place. Imitation also served as a strategy for both groups of children to participate in communication, even though they may not have had spontaneous contributions to make.

Both C.L.'s classroom teacher and resource teacher felt that C.L. was in the proper placement and that she was able to keep up in conversation with her peers. Her mother also has found that when adults may have a hard time understanding C.L., children usually don't. She wonders if that is because they are so used to having peers with speech problems, that they are more attuned to that.

C.L. is aware of what she wants and is not a pushover in the classroom. S.R., C.L.'s resource teacher, says, “She is good at saying ‘no’. She’s good at defining her own space and saying, ‘No, I don’t want to do that.’” Her classroom teacher J.H. also sees a growth in her assertiveness and independence. “She is showing more of a mind of her own. She’ll challenge...”
you now” J.H. says. “In some respect, where you’re asking one kid not to contest you, you’re really glad when she is because she’s showing that she’s thinking on her own and she’s trying to be her own person.” She sees this as a huge development for C.L. It shows awareness and skill in analyzing and evaluating her world.

Alton (1998) warns against mistakes often made in the classroom with Down syndrome children. Adults often judge their language skills by their expressive, and not receptive abilities. This results in short-changing of exposure and expectations such as adults asking yes/no questions or finishing sentences for the child, instead of offering extra time or help so they can do it themselves. J.H., C.L.’s classroom teacher, seems to take this principle very seriously regarding language and behavior in general. She says that she is pleased when she sees children going out of their way to help C.L. if she drops something in the hall or if she needs a reading partner, but she emphasizes, “I have made it clear that I don’t want anybody doing for C.L. what C.L. can do for herself.”

Parents are an important part of the decisions made about their children’s education. In particular, parents of children with Down syndrome seem to be well informed about the behavioral features associated with their child’s disability, in this case a specific verbal deficit, and advocate for their support services (Fidler, Hodapp & Dykens, 2002). C.L.’s last speech therapist was T.W., whose services ended when C.L. was 3 years old and was transferred to preschool in the public school system. But, her mother thinks this was the appropriate decision and that the experience she is getting with verbal interactions in her classroom is very important.

There have been important findings about the effects on language of placement in mainstream schools versus special schools. Laws, Byrne and Buckley (2000) compared
students with Down syndrome from a school district where mainstreaming was common to students in a district where it was very rare, so that the variation between the two groups was accounted for largely by policy instead of individual differences. They found that the mainstreamed students had significantly stronger skills in vocabulary, grammar and digit-span memory, despite the more one-on-one language therapy received in special schools. This hints at the importance of verbal interaction with more advanced peers in furthering growth as well as other differences such as teacher expectations and advanced language. In a study on parent satisfaction with their Down syndrome child’s educational placement, parents whose children were in a mainstream classroom were least likely to desire a program change (Freeman, Alkin & Kasari, 1999).

The Role of Parents

T.W. thinks that parents are an integral part of child language learning and encourages them to participate in her speech therapy. She says:

One big thing in early intervention is parental education and helping develop strategies and techniques that they can implement in the home. One or two hours of therapy a week is not the cure-all. C.J. (C.L.’s mother) was pretty on top of C.L. If I made suggestions, then she incorporated them.

The nice thing about their speech program is that C.L. was allowed to watch the interactions so that she knew what to do at home. Research has shown that parents who are trained by seeing examples of professionals engaging in social stimulation are better at implementing those behaviors than parents who have to learn from a workbook. Better training results in a higher Social Development Quotient for their infants (Sanz Aparicio, M.T. & Balana, J.M., 2003).
T.W. does not believe that the number of hours a child spends in therapy is a sole determinant of eventual linguistic competence. She says,

The biggest piece is educating the parents, and ultimately it comes down to family motivation. I can have Parent A and Parent B, and they both have a child with Down syndrome. They both bring them two times a week, but one mom I have has four other kids and her youngest has Down syndrome. Her husband worked a lot and the mom was practically asleep in our sessions. There wasn’t much carryover in the home. But when you have family like C.J. and her parents are pro-active as well, that’s the key, not how much time the therapist spends with them.

Parents remain important teachers and communication partners as their children get older. There are many parental interaction patterns that are associated with better language-learning in children. One major contributor to the strength in lexical development often seen in children with Down syndrome is that parents of children with Down syndrome make more requests for object identification than parents of typically developing children matched for linguistic sophistication (Johnson-Glenberg & Chapman, 2004). This gives the children more practice and helps build their vocabulary.

Play is not just for fun. In something as simple as playing with their children, a parent can be assisting language. Fewell and Ogura (1997) found that play is a natural place to observe, assess and intervene in children’s development. They observed that competence and sophistication in play were significantly related to language production when measured by the length of the child’s utterances. They also found evidence that play and language appear to advance in parallel. Play also occurs in a less formal, more natural and relaxed atmosphere, so the kind of language that emerges during play may be more indicative of a child’s
developmental level, and the kind of intervention that may be implemented is more relaxed and comfortable for the child.

Vilaseca and del Rio (2004) addressed the importance of mothers’ interactions in eliciting speech from children with Down syndrome, working on the hypothesis that naturalistic intervention can be used to help maximize the amount of verbal and social interaction. They explained the goals of this type of therapy:

Naturalistic intervention aims to help children with language development difficulties to improve their language skills by setting up situations that provide the child with opportunities to learn through interactive processes appropriate for their age and learning style, similar, although not necessarily identical, to those afforded in natural settings for normally developing children (p.164).

The hallmark of naturalistic intervention is a child-centered approach, which allows the child to lead in conversation and maintain more control over the communication. This approach does not use any formal rehearsal in an attempt to make language gains more generalizable to other interactions. They also never used negative feedback and used positive feedback for every utterance, even if it wasn’t completely correct or relevant. The researchers frequently used expansions, substitution sequences, and informative-corrective feedback. These strategies were associated with an increase in the mean length of utterances and an increase in the amount of two or more word utterances including a verb, although without a comparison group, it is impossible to know whether these increases would have occurred on their own. We do see, however, that all of the participants used longer utterances with a verb in interactions with their therapist than they do with their mothers. If mothers were trained to
interact with their children in this way, their constant naturalistic intervention would probably be more effective than the observed results with a therapist.

Bryen and Joyce (1985) also found evidence for a similar type of intervention, which they call the "interaction" model. The model is based on a belief that language is learned through two-way interactions set in normal daily routines. Some strategies are "ongoing modeling, commenting on, and confirming the learner’s communicative attempts, play and object exploration, following the learner’s “conversational” lead, offering the learner choices in the context of daily routines, and generally being a responsive conversational partner" (p.20). This strategy is most similar to how parents teach their non-handicapped children to speak, and again capitalizes on what parents have always known about teaching their typically developing children language.

C.J. feels strongly about the complexity of language she uses with her daughter. "I don’t talk down to her," she says. C.J. observed C.L learning through mimicking at a very early age, and made sure that she wasn’t talking in "baby talk" so that C.L. wouldn’t learn dumbed-down speech.

Reading as a Language Aide

Yes, it is certainly possible for children with Down syndrome to read, and C.L. has made great strides in her reading this year. Alton (1998) suggests that reading may capitalize on visual learning skills and aid language comprehension, vocabulary, and sentence structure. Reading aloud can help with articulation.

S.R. is C.L.'s resource teacher. They meet 4 times a week during the school day for 45 minutes in a small group to work specifically on reading. They use a program called Direct Instruction, a very scripted, specific workbook and storybook series that begins with basic
phonetics and builds on that. The storybooks use a special system of type. Silent letters are small so the children know not to pronounce them. Long vowels always have a line over them, and there are no capital letters used since they have been familiarized in the basic phonetic period with lower case letters. Each story is one page long, and the accompanying picture is on the back of the page so that the children cannot use picture clues to help them decipher the words.

S.R. says “Her reading has just exploded in the last month or so. Her decoding skills have just... she’s really getting good at it.” During “popcorn reading,” a time when the kids read a few lines and then “popcorn” the reading to someone else, S.R. has a hard time getting C.L. to give up her page! She really enjoys reading. At home, she is now beginning to understand the humor in the books. While she reads about “Yuk Soup,” which is made of old socks, soap, and a lot of other yucky ingredients, she laughs so hard she can barely keep reading. This shows that she isn’t just making the proper sounds; she is comprehending. The quality of her reading is really beginning to change as well. S.R. says, “She’s very good at projecting, and she’s starting to get some intonation and some voice when she reads. I’m starting to see more of that as she gets confident in her reading skills. I can see a little bit of inflection, which is really neat to her.”

This advance in reading skills has been linked with more participation with the typically developing children in her reading group. The kids have been interacting more, and before class starts, she waits outside and they all hide until she comes to find them, something the kids think is hilarious. S.R. directly relates this to C.L.’s improvement in reading, saying “Especially as she has become more confident in her reading, they have become much more of a cohesive group and they will include her a lot more. She has become much more verbal and
much more willing to participate.” C.L. now wants to go first at reading time and appears to be much more willing to participate. S.R. has really seen her verbal skills grow this spring.

Occasionally C.L. has problems staying focused in class so S.R. uses little rewards like stickers to encourage participation. She also lets the kids draw on the chalkboard if they finish their activities early. She finds that with C.L., using humor, like doing lessons in a funny voice, can help get her back on track. C.L. has glasses but S.R. wonders if sometimes she has trouble seeing the letters on the page, and during class, she will sometimes bring the book very close to C.L.’s face. S.R. does not notice C.L. making many errors in her speech, but even if she did, she is not preoccupied with correcting them. She says, “To me it’s more important for her to communicate and feel more comfortable with that communication than correcting her.” She also does not have a hard time understanding C.L.’s speech, although she has met many children with Down syndrome who were less easy to understand. She does find that C.L. often has a hard time with memory, but she is patient with her, and overall she says, “She loves to read, and what a great way for her to get enjoyment.”

J.H. focuses on how to expand on C.L.’s reading. She sees reading as an opportunity to build C.L.’s speech and critical thinking. She encourages reflection on the reading, “She’s very literal, and that’s where she is developmentally. But now you want to push her to brainstorm and be a little more higher level in her ability to think things through.” She recommends asking harder questions about the reading. C.L. is perfectly capable of pointing out that the boy in the story is wearing a green shirt, and it is now time to ask her more difficult questions like what color shirt she would want to be wearing if she was the boy in the book. As for suggestions of things to work on at home, J.H. recommends actively challenging C.L.’s verbal expression.
She says, “Make her accountable for her awareness by asking questions to get her to realize that all ideas have words. Ask her to tell you more, and expand.”

Mom C.J has heeded this advice. She reads books to her daughter every day, and C.L. often reads to her as well. C.J. likes to ask C.L. questions about the books they are reading together so that she understands the content of the story and not just the reading. For example, in the story *Arthur’s Television Trouble*, she will ask C.L. “How did Arthur get the money to buy the Treat Timer?” or, “What happened first; Arthur bought the treat timer, Arthur moved the papers or Arthur watched The Bionic Bunny Show?” These questions challenge her critical thinking in addition to her reading and comprehension skills.

**Conclusion**

Results from 43 studies on language intervention with the mentally handicapped found that gains in language often come with other benefits. They found improvements in adaptive behavior, like “increased bladder control; reductions in tantrums, bizarre and stereotypic behaviors; improved attention and self-help skills; increased manageability, and so forth” (p.22). They also found a decrease in frustration and acting out behaviors, as communication enabled those studied to affect their environment by request instead of force. They described this phenomenon saying, “As students learn that they can have some control over their environments, reduction in behaviors characterized as learned helplessness are also likely to be reduced” (p.22). A welcome effect on caretakers was found almost universally. Compliance to their requests was more often achieved, as the children understood what was being asked of them and negotiated if need be.

C.L. can certainly see these co-occurring benefits in her C.L.’s life. When asked how C.L.’s language development changed her relationship with her mom, C.J. says, “Without C.L.
being able to communicate, she would just get frustrated. She wouldn’t be able to tell me she had to go to the bathroom or tell me what she wanted.” Being able to speak for herself allowed C.L. to communicate her needs and her inquisitiveness. C.J. saw this expanding her horizons, “The world has opened up for her. She surprises me with some of the questions she asks me. Language has really been the key to her cognitive development. It allows her to verbalize the things she is curious about.”

Language acquisition is an important part of integration into society. T.W. believes that social motivation really drives children with Down syndrome to communicate. She says, “I think it’s huge for kids when they develop some language skills and they realize that they have the capability to communicate with peers or adults. I think the social piece grows from there because they feel confident they have these skills.” This seemed to weigh heavily in C.L.’s success. T.W. says, “C.L. was social and motivated. She wanted the interaction, so I think that’s a huge part of it.” Researchers agree. Bryen and Joyce (1985) concluded that if “impaired individuals do not first have the desire to interact with others in their environment then it is unlikely that they will acquire a functional communication system, regardless of existing cognitive abilities or intervention methods employed” (p.13).

C.J. says that C.L. has always been very friendly and socially motivated. “She likes to be in the thick of everything.” C.J. recalls, “She has always been more outgoing. I think part of it is her personality and part of it is that she’s been going to work and business meetings with me since she was 6 weeks old. The exposure to adults probably has a lot to do with it.” For whatever reason, C.L. is very motivated to interact with others, and that makes language an important goal for her.
Lately, C.L. has been out sharing her newly acquired language skills with people in her community. C.J. and C.L. made a trip to their neighborhood coffee shop last weekend and C.L. started following around a young dad who was there with his family. When C.J. requested that C.L. come back over by her, C.L. replied, “No. I want to go with him.” Then, the man and his family sat down and C.L. approached them, saying “Hi! What’s your name?” and proceeded to introduce herself, make small talk for a while and tell them about a recent family trip to Charleston.

The added benefits of acquiring functional communication, along with the importance of linguistic interaction are ample evidence for attention to the language difficulties in children with Down syndrome. The impressive gains shown by C.L. are also encouraging. There is no doubt she is not a typical child with Down syndrome. In fact, T.W. said, “C.L. is one of the brightest children with Down syndrome that I have ever seen.” But research shows that language gains are possible and achievable in children with Down syndrome given the right understanding and intervention.
References


Appendix

Semi-Structured Interview Questions

Speech Therapist T.W.

1. What is an early language intervention?

2. How early does it begin, and what kind of activities does it entail?

3. How important are gestures in early communication and how do they relate to speech?

4. In what circumstances do you introduce a non-verbal language?

5. What are the markers that a child is ready to learn language?

6. What makes language learning hard for children with Down syndrome?

7. What are the relative strengths and weaknesses in the language of children with Down syndrome?

8. How do you make sure that language becomes spontaneous and isn’t just rote memorization used in therapy sessions?

9. What are the social implications for a child whose language improves?

10. How do you address problems with joint attention?

11. How does memory affect language acquisition?

12. What is the most important thing parents can do to aid language acquisition in their infants and young children with Down syndrome?

13. What kind of reinforcements do you use or recommend for children with Down syndrome?

14. Ideally, how many hours a week would you spend with each child?
Resource Teacher S.R.

1. What is your role as C.L.’s resource teacher?

2. What are the specific speech and language activities you do with C.L.?

3. How does her speech compare to other children with Down syndrome you have worked with?

4. What are her linguistic strengths and weaknesses?

5. Is C.L. able to interact effectively with adults and other students?

6. How do you correct her mistakes?

7. What kind of reinforcements do you use?

8. How does being in a mainstream class effect C.L.’s speech and language skills?

9. What makes language, in general, difficult for children with Down syndrome?

10. How does memory effect language learning?

11. How does attention effect language learning?

12. How have C.L.’s interactions with her peers changed in the time that you have known her?
Classroom Teacher J.H.

1. How do C.L.'s language skills compare to other students in your class?
2. What are her linguistic strengths and weaknesses?
3. What are her academic strengths and weaknesses?
4. Do you do any speech-specific activities in class?
5. Does her level of speech impair interactions with her classmates?
6. When she makes mistakes in speech, how do you correct her?
7. What kind of reinforcement do you use?
8. How does C.L.'s placement in a mainstream class affect her language skills?
9. Do you make suggestions for things she can work on at home?
10. In what ways is C.L. treated differently than other students in the class?
11. How has C.L.'s language changed over the school-year?
Mom C.J.

1. What was the format of C.L.'s early intervention program?
2. How did you know that sign language would be a useful communication system for C.L.?
3. How old was she when she began using signs on her own?
4. What were the signs, and why do you think these were the first ones she used?
5. How did you present the signs? Were they accompanied by spoken language?
6. At what point did she transition from signed to spoken language?
7. What were her first words?

1. How good are C.L.'s teachers at keeping you informed and how often do you see them?
2. Do you think C.L.'s speech therapy stopped at the appropriate time?
3. What do you do to encourage growth in her language skills?
4. How has C.L.'s placement in a mainstream class affected her language skills?
5. What are her linguistic strengths and weaknesses?
6. Do people ever find her difficult to understand?
7. How do you correct her mistakes?
8. Does memory affect her speech?
9. Does attention affect her speech?
10. What is going on when she says something like “We... we... we... we went to Claudia’s house and I saw Zoe”?
11. When C.L. was younger, did she have problems with gaze following?
12. When C.L. was younger, did she have problems with gesturing?
13. Has she ever had hearing problems? How does that affect her speech?
14. How has imitation played into her language-learning?

15. Has she always been so friendly and motivated to communicate?

1. Did you see a marked increase in C.L.’s non-verbal communication before she started to use verbal communication?

2. How much did you have to rely on your own patience during C.L.’s transition to verbal language?

3. What was happening when C.L. used to babble with the inflection of spoken sentences?

4. Why is it that you make a point of not talking down to her?

5. What is C.L. learning about language by talking with her typically developing peers?

6. What is your role in teaching C.L. verbal skills? How do you challenge her?

7. What are the reading activities you do together?

8. Do you see C.L.’s reading skills influencing her verbal skills?

9. Once C.L. learned to talk, how did your relationship change?