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Specific Language Impairment

Is there a genetic component? Part 2

Specific Language impairment (SLI) is a condition of children who have delayed mastery of language skills compared to that of their peers and affects 6-7% of children around kindergarten age. Children with SLI do not have mental disability, hearing loss, autism, or other syndromes associated with language impairment. The cause of SLI is unknown, although genetic influences are likely. Some children with SLI may not begin to talk until their third or fourth year. When language does begin, children with SLI often speak in short sentences showing particular problems with verbs.

researchers investigate a wide range of SLI characteristics including diagnosis, speech, genetics, syntax/grammar, word learning, treatment, etc. The aim of our BNCD research is a more complete understanding of the nature of the disorder in order to improve diagnostic and treatment processes.

The Director of the BNCD and an active investigator, Dr. Mabel Rice is recognized as a leading authority on the condition of SLI. In 1993, she embarked on a longitudinal, family-based study that is projected to continue through 2014 and beyond. This study examines the genetic factors contributing to Specific Language Impairment

(SLI Continued on page 2)

AT KU, research is underway on this multifaceted language disorder. Several BNCD



Image by Vlado

KU Researchers Find Enriched Infant Formulas Benefit Brain and Heart

University of Kansas scientists have found new evidence that infant formulas fortified with long chain polyunsaturated fatty acids (LCPUFA) are good for developing brains and hearts.

In the randomized, double-blind study, 122 term infants were fed one of four formulas from birth to 12 months; three with varying levels of two LCPUFAs (DHA and ARA) and one formula with no LCPUFA, and tested at four, six and nine months of age.

By simultaneously measuring the heart rate and visual attentiveness of infants while they looked at images of adult hu-

man faces, John Colombo and Susan Carlson found that infants who were fed fortified formula were more cognitively advanced and their heart rates were lower than infants who were fed formula without LCPUFA. The formula with the lowest level of LCPUFA — 0.3 percent level — was found to be sufficient to produce these benefits.

The study is the first randomized clinical trial of postnatal DHA supplementation to measure attention.

Colombo, a neuroscientist who specializ-

(Formula continued on page 2)



Image KU University Relations

(SLI from page 1)

among children and their family members. Results from the study led to the development of the first test to successfully diagnose Specific Language Impairment (SLI) in children ages 3 to 8. In collaboration with Ken Wexler from the Massachusetts Institute of Technology, she developed the Rice/Wexler Test of Early Grammatical Impairment, published by The Psychological Corporation in 2001. The test is used by speech language professionals and researchers worldwide.

Although the cause of SLI is unknown, a genetic component to the impairment has been suspected for some time. SLI is known to run in families. If a parent has a history of being a late talker themselves, it's more likely that one of their youngsters will have that history as well. Other studies show that children who are identical twins are more likely to both have SLI than children who are fraternal twins, a finding supporting possible inherited influences.

Dr. Rice, working in collaboration with Shelley Smith at the University of Nebraska Medical Center, reported that the gene, KIAA0319, appears to play a key role in SLI and is a possible gene for language acquisition as well as reading development in young children. Dr. Rice and her team discovered that mutations in KIAA0319 had a significant effect on language traits that are characteristic of SLI -- traits that can also be present in dyslexia, some cases of autism, and speech sound disorders. Dr. Rice suggests that these findings lend support to the idea that difficulties with reading and understanding printed text may be coming from the same genes that influence difficulties in learning language. If this is so, she says, early detection and diagnosis will be the key to helping children with SLI close the reading gap between themselves and their peers.

In the past, children with SLI were encouraged to just work harder. Now, with the evidence to support a possible genetic influence on SLI, parents and children know that talking on time or speaking correctly may not be something that youngsters with SLI can make themselves do. The outcomes of Mabel Rice's research will hopefully lead to new clinical methods to identify individuals who are unlikely to outgrow early childhood language impairments. Further, her discoveries contribute to our understanding of individual variation in word and sentence production. She appreciates the research participation of the many families and children who contribute to an improved understanding of SLI.

(Infant Formula from page 1)

es in the measurement of early neurocognitive development, said that the findings add to the mounting evidence that these nutritional compounds positively affect brain and behavioral development.

DHA or docosahexaenoic acid is an essential long-chain fatty-acid that affects brain and eye development, and babies derive it from their mothers before birth and up to age two. But the American diet is often deficient in DHA sources such as fish.

ARA or arachidonic acid is another LCPUFA that is present in breast milk and commercial formula.

The study was designed to examine the effects of postnatal DHA at levels that have been found to vary across the world, said study co-director Carlson, A. J. Rice Professor of Dietetics and Nutrition at KUMC.

Colombo and Carlson's earlier work and collaborations influenced infant formula manufacturers to begin adding DHA in 2001.



Image by Sura Nualpradid

Additional Research Participation Opportunities

Help us learn how toddler nutrition affects children's immediate cognitive performance.

The purpose of this study is to determine if a low glycemic beverage benefits short-term cognitive performance in children.

Age: 3-year-olds (between 33 and 39 months)

Time Commitment: Children will complete 3 visits over approximately 2 weeks. At the 1st visit, information about the study will be provided and children will complete two short tasks; the session will last about 45 minutes. During the 2nd and third visits, children will receive either a high or low glycemic drink, children will then participate in a series of short play sessions and complete several cognitive tasks; these sessions will last about 2.5 hours each. All sessions are completed at the KU Edwards Campus (126th & Quivira in Overland Park, KS).

Benefits: Your child's participation can help further our understanding of the affects of toddler nutrition on cognitive performance. Families will also receive up to \$75 for completing this study (\$15 at the first visit and \$30 each at the 2nd and 3rd visits).

Contact: KU Infant and Early Cognition Lab; babylab@ku.edu; 913-897-8590



Image by koratmember

How do infants tell the difference between numbers? Does short-term memory play a role in this ability?

The purpose of this study is to understand the relationship between infants' ability to tell the difference between numbers (i.e. are 2 apples different from 3 apples?) and their short-term memory.

Age: 6-month-olds

Time Commitment: Two 30-minute visits. The first visit will occur at 6 months and infants will complete a number task. The second visit will occur at 9 months and infants will complete both a number task and a short-term memory task. Testing will be scheduled at times convenient for you and will take place in our lab at the Edwards Campus in Overland Park.

Benefits: Assisting in important research on the cognitive development of infants; small token of appreciation for your infant

Contact: KU Infant and Early Cognition Lab (Edwards Campus); babylab@ku.edu; 913-897-8590

Input Sources of Grammatical Deficits in Specific Language Impairment (SLI)

Preschoolers with SLI often make grammatical errors involving pronouns and verbs (e.g., *him running* or *he running* to mean *he is running*). In this NIH-sponsored study, we are testing the possibility that some of these errors are due to children's incomplete understanding of certain types of sentences that adults commonly use to talk to children. For example, a child who hears sentences like, *I see him running*, may think that it's okay to say sentences like, *Him running*.

Ages: 4- and 5-year-olds with SLI

Time commitment: Four 1-hour testing sessions and ten 15-minute experimental sessions. These can occur at KUMC or in your home.

Benefits: Free language evaluation; \$10 per visit to KUMC; \$15 gift card for participating in preliminary testing session; \$75 gift card for completing all experimental sessions. Gift cards are good for new books.

Contact: Marc Fey, Ph.D. (913) 588-5937 mfey@kumc.edu or Shelley Bredin-Oja (913) 588-0574 sbredin-oja@kumc.edu

Do you have trouble understanding your child's speech? Does your child have difficulty learning new words?

The purpose of this research project is to examine word learning by preschool children with language or speech sound delays. We want to determine how the organization of words and sounds affects children's ability to learn new words and to develop effective vocabulary teaching strategies.

Ages: 4-5 year old children with (1) language delays or (2) speech sound delays

Time commitment: 5 weekly sessions lasting 45- to 60-minutes. Sessions will be scheduled at your convenience in a suitable location (e.g., your home, nearby library, KU campus)

Benefits: Free speech-language evaluation with report; small prizes for your child; compensation for travel expenses

Contact: Word & Sound Learning Lab; [785-864-4873](tel:785-864-4873); wrdlrng@mail.ku.edu
Website: www.ku.edu/~wrdlrng

BNCD INVESTIGATOR COLLABORATION

Nancy Brady will head up a pilot investigation to test an intervention aimed at increasing word learning. The study will focus its efforts on nine, non-



Nancy Brady

-verbal, school-age children with autism. Preschoolers may receive speech intervention, but there appears to be less focus on speech intervention for children once they reach school age. Dr. Nancy Brady, who is a certified speech language pathologist with over 15 years of experience conducting interventions for

early communicators, has developed an innovative intervention package in consultation with BNCD co-investigators Holly Storkel and Kathryn Saunders. They plan to use a "multimodal" approach that will use joint book reading, visual supports, sound practice of targeted words, etc. It will combine speech teaching with AAC (Augmentative and Alternative Communication) in daily hour-long intervention sessions. Recent research on connections within the brains of children with autism suggests that a multimodal approach may facilitate learning for some students. Further recording and analysis of the child's vocalizations will show a fingerprint of each child's individualized language.

Dr. Storkel will advise on word identification

based on sound characteristics; Dr. Saunders will consult on the written aspect of the intervention therapy; Dr. Debora Daniels will act as a primary liaison with the schools and help construct intervention activities.



Left to Right—Holly Storkel,

Kathryn Saunders, Deborah Daniels

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About this Newsletter:

The BNCD newsletter is designed to keep you informed about the ongoing research projects that are being conducted by BNCD researchers at the University of Kansas. Participants who have been part of recent research projects conducted by BNCD researchers, parents who have expressed interest in participating in future research, and individuals from organizations such as schools and daycare centers that have an interest in BNCD studies will receive this newsletter from time to time to keep them up-to-date about the research activities at the BNCD. If you do not wish to receive future newsletters, please call or e-mail the BNCD to have your name removed from our list. Research at the BNCD is supported in part by grant number 5 P30 DC05803 from the National Institute on Deafness and other Communication Disorders (NIDCD) at the University of Kansas.

It's the first snowfall of the winter and Charlie wants to find a good hill to try out his new sled.

Find the correct path through the maze.

