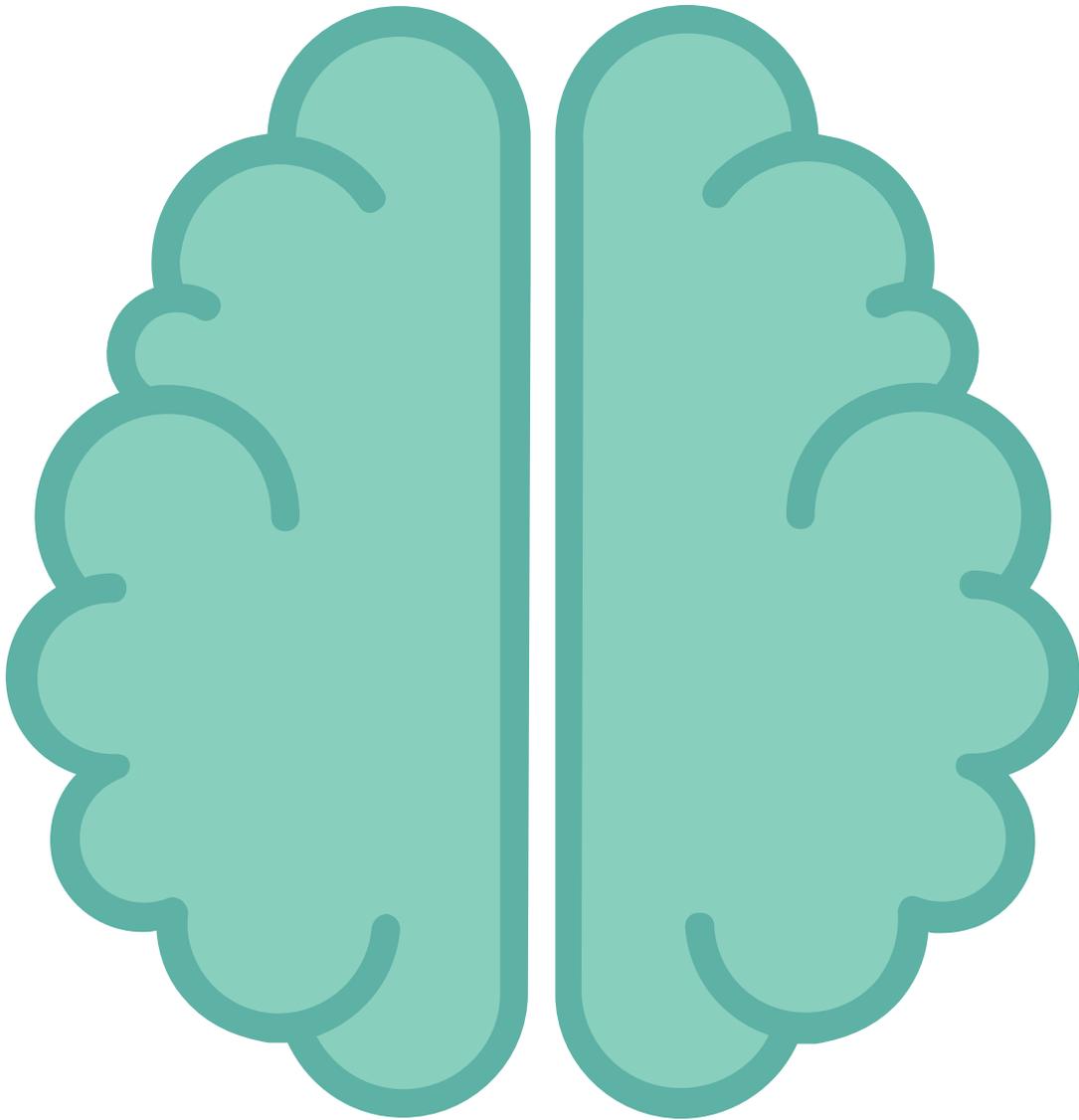


How Over 30 Years of Child-Development Research Became an Ed-Tech Revolution.



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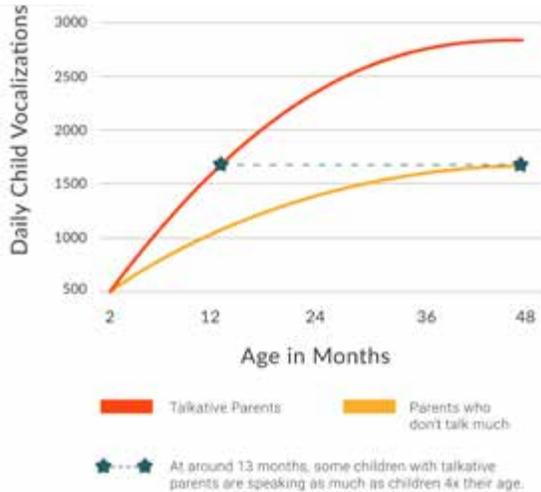
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The Biggest Surprise.

How VersaMe used 30 years of early-education research to change early education



Three years ago, at Stanford University, Sloan Fellows Jon and Chris Boggiano and Nicki Boyd began looking into the research behind our current understanding of early education. It didn't take them long to discover a wide gap existed between what researchers were finding about how children learn and what parents understood about education. After a deep dive into over 30 years of research, the three found that a good deal of conclusions pointed in the same direction -

quality interaction between caregivers and children through the years of 0-4 can greatly improve the chances of those children reaching their educational potential. So why, in this age of apps and smartphones and machine-learning, has it taken so long for anyone to address (and promote) this fact effectively? Nicki, Jon, and Chris formed VersaMe; and with the help of early-education advisors including Anne Fernald, the Director of Stanford Language Learning Lab, they began making plans to help all parents boost their children's development.

VersaMe's breakout product was the Starling - the early-education wearable that measures and boosts holistic development in children 0-4 years old. In the following pages you'll find some of the research that led to the development of the Starling and the machine-learning platform (Spoke™) that serves as the foundation for all VersaMe's ed-tech. For more information on VersaMe, the Starling, or Spoke, visit VersaMe.com



“
Increasing the quantity and quality of parental-child engagement could have a transformational impact on American society.

”
Anne Fernald
Director of Stanford Language Learning Lab



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The Science of Early Childhood Development.

National Scientific Council on the Developing Child

In an effort to identify those aspects of development that are accepted broadly by the scientific community, the National Scientific Council, based at the Center on the Developing Child at Harvard University, brought together several of the nation's leading neuroscientists, developmental psychologists, pediatricians, and economists. This document presents their critical review of the existing literatures in their fields and a consensus about what we now know about development in the early childhood years. The objective of the Council is to move beyond the public's fascination with "the latest study" and focus on the cumulative knowledge of decades of research that has been subjected to rigorous and continuous peer review. The goal of this document is to help the public and its policy makers understand the core principles of that body of work that are now sufficiently accepted across the scientific community to warrant public action.

[See the whole report.](#)



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Benefits, Costs, and Explanation of the High/Scope Perry Preschool Program.

Lawrence Schweinhart

The High/Scope Perry Preschool Study is a study of the effects of a high-quality preschool program for children born in poverty. Randomly assigning 123 children to program or no-program control groups, the study has had little attrition on a variety of measures from age 3 to age 41. It found evidence of preschool program effects on children's readiness for school and their subsequent educational success, economic success in early adulthood, and reduced number of criminal arrests throughout their lives. These benefits add up to a large return on public investment. This study combines with the Abecedarian Study and the Chicago Child-Parent Centers Study presented in this session to provide strong, robust evidence of the lasting effects of high-quality preschool programs on young children living in poverty. The continuing challenge is to take such programs to scale so that all preschool programs for young children living in poverty have similar effects.

[See the whole paper.](#)



The Economics Of Early Childhood Investments.

Executive Office of the President of the United States

Early childhood, beginning in infancy, is a period of profound advances in reasoning, language acquisition, and problem solving, and importantly, a child's environment can dramatically influence the degree and pace of these advances. By supporting development when children are very young, early childhood development and education programs can complement parental investments and produce large benefits to children, parents, and society. An analysis by the President's Council of Economic Advisers describes the economic returns to investments in childhood development and early education. Some of these benefits, such as increases in parental earnings and employment, are realized immediately, while other benefits, such as greater educational attainment and earnings, are realized later when children reach adulthood. In total, the existing research suggests expanding early learning initiatives would provide benefits to society of roughly \$8.60 for every \$1 spent, about half of which comes from increased earnings for children when they grow up. [See the whole paper.](#)



Enrollment in Childcare and Pre-School.

Organization for Economic Co-operation and Development

This paper presents information on the use of childcare and pre-primary education services by children under school age across OECD countries. Because in most OECD countries the type and usage of services differs by child age, the information presented in this indicator is generally separated into usage among children aged between 0 and 2 and usage among children aged between 3 and 5. The child's third birthday is used as the breakpoint because it is at this age that children are able to move into pre-primary education in most – although not all – OECD countries (see indicator PF4.1). This indicator captures usage through four measures: participation rates for 0-2 year olds in formal childcare and pre-school services, average hours in formal care during a usual week for 0-2 year olds who use formal childcare and pre-school services, full-time equivalent (FTE) participation rates for 0-2 year olds in formal childcare and preschool services and participation rates for 3-5 year olds in pre-primary education. [See the whole paper.](#)



Individual Differences in Lexical Processing at 18 Months Predict Vocabulary Growth in Typically Developing and Late-Talking Toddlers.

Anne Fernald & Virginia Marchman

Using online measures of familiar word recognition in the looking-while-listening procedure, this prospective longitudinal study revealed robust links between processing efficiency and vocabulary growth from 18 to 30 months in children classified as typically developing (n= 46) and as “late talkers” (n= 36) at 18 months. Those late talkers who were more efficient in word recognition at 18 months were also more likely to “bloom,” showing more accelerated vocabulary growth over the following year, compared with late talkers less efficient in early speech processing. Such findings support the emerging view that early differences in processing efficiency evident in infancy have cascading consequences for later learning and may be continuous with individual differences in language proficiency observed in older children and adults. [See the whole paper.](#)



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Sharing Books with Infants and Toddlers: Facing the Challenges.

Barbara Kupetz & Elise Green

Although the literature on the importance of reading to the very young is extensive (Kontos 1986; Lamme & Packer 1986; Dinsmore 1988; Trelease 1989; Hanson 1991) and most early childhood professionals realize the value of introducing books early, it is the frustration they feel in actually implementing book sharing that stands in the way of frequent and early book experiences...The benefits of early book experiences include helping the infants eyes to focus and their recognition of objects, development of language, and enhancement of listening skills; in addition to building sensory awareness, reinforcing basic concepts, stimulating the imagination, extending experiences, providing a good reading model, and establishing physical closeness so critical to the young child's emotional and social development. [See the whole paper.](#)



Literacy Promotion: An Essential Component of Primary Care Pediatric Practice.

Council on Early Childhood from the American Academy of Pediatrics

Reading regularly with young children stimulates optimal patterns of brain development and strengthens parent-child relationships at a critical time in child development, which, in turn, builds language, literacy, and social-emotional skills that last a lifetime. Pediatric providers have a unique opportunity to encourage parents to engage in this important and enjoyable activity with their children beginning in infancy. Research has revealed that parents listen and children learn as a result of literacy promotion by pediatricians, which provides a practical and evidence-based opportunity to support early brain development in primary care practice. The American Academy of Pediatrics (AAP) recommends that pediatric providers promote early literacy development for children beginning in infancy and continuing at least until the age of kindergarten entry by (1) advising all parents that reading aloud with young children can enhance parent-child relationships and prepare young minds to learn language and early literacy skills; (2) counseling all parents about developmentally appropriate shared-reading activities that are enjoyable for children and their parents and offer language-rich exposure to books, pictures, and the written word; (3) providing developmentally appropriate books given at health supervision visits for all high-risk, low-income young children; (4) using a robust spectrum of options to support and promote these efforts; and (5) partnering with other child advocates to influence national messaging and policies that support and promote these key early shared-reading experiences. [See the whole paper.](#)



SES Differences in Language Processing Skill and Vocabulary are Evident at 18 months.

Anne Fernald et. al.

This research revealed both similarities and striking differences in early language proficiency among infants from a broad range of advantaged and disadvantaged families. English-learning infants (n=48) were followed longitudinally from 18 to 24 months, using real-time measures of spoken language processing. The first goal was to track developmental changes in processing efficiency in relation to vocabulary learning in this diverse sample. The second goal was to examine differences in these crucial aspects of early language development in relation to family socio-economic status (SES). The most important findings were that significant disparities in vocabulary and language processing efficiency were already evident at 18 months between infants from higher-and lower-SES families, and by 24 months there was a 6-month gap between SES groups in processing skills critical to language development. [See the whole paper.](#)



Development of Fetal Hearing.

Peter Hepper & Sara Shahidullah

Previous research has revealed that the human fetus responds to sound, but to date there has been little systematic investigation of the development of fetal hearing. The development of fetal behavioral responsiveness to pure tone auditory stimuli (100 Hz, 250 Hz, 500 Hz, 1000 Hz, and 3000 Hz) was examined from 19 to 35 weeks of gestational age. Stimuli were presented by a loud-speaker placed on the maternal abdomen and the fetus's response, a movement, recorded by ultrasound. The fetus responded first to the 500 Hz tone, where the first response was observed at 19 weeks of gestational age. The range of frequencies responded to expanded first downwards to lower frequencies, 100 Hz and 250 Hz, and then upwards to higher frequencies, 1000 Hz and 3000 Hz. At 27 weeks of gestational age, 96% of fetuses responded to the 250 Hz and 500 Hz tones but none responded to the 1000 Hz and 3000 Hz tones. Responsiveness to 1000 Hz and 3000 Hz tones was observed in all fetuses at 33 and 35 weeks of gestational age, respectively. For all frequencies there was a large decrease (20-30 dB) in the intensity level required to elicit a response as the fetus matured. The observed pattern of behavioral responsiveness reflects underlying maturation of the auditory system. The sensitivity of the fetus to sounds in the low frequency range may promote language acquisition and result in increased susceptibility to auditory system damage arising from exposure to intense low frequency sounds. [See the whole paper.](#)



A Longitudinal Investigation of the Role of Quantity and Quality of Child-Directed Speech in Vocabulary Development.

Peter Hepper & Sara Shahidullah

Quantity and quality of caregiver input was examined longitudinally in a sample of 50 parent-child dyads to determine which aspects of input contribute most to children's vocabulary skill across early development. Measures of input gleaned from parent-child interactions at child ages 18, 30, and 42 months were examined in relation to children's vocabulary skill on a standardized measure 1 year later (e.g., 30, 42, and 54 months). Results show that controlling for socioeconomic status, input quantity, and children's previous vocabulary skill; using a diverse and sophisticated vocabulary with toddlers; and using decontextualized language (e.g., narrative) with preschoolers explains additional variation in later vocabulary ability. The differential effects of various aspects of the communicative environment at several points in early vocabulary development are discussed.

[See the whole paper.](#)



How Parents Read to Children.

Barry Guinagh & Jester Emile

Teachers of young children have long believed that mothers and fathers should read to their preschool children. In picturing a parent reaching to a child one visualizes a radiation of love and affection. In addition to the presumed benefits to the child from his affective interaction, reading to a child also encourages academic achievement at a later date. Gallup (1969) studied 1,045 mothers and found that 70 percent of high achieving first graders were read to regularly in their early years, while on 49 percent of low achieving first graders were read to by their mothers. Gallup concluded that children who were read to regularly at an early age did better in school than those who were not. There is even some evidence that reading to infant produces benefits. Irwin (1967) persuaded 55 mothers of one-year-old children to read aloud to them for at least ten minutes a day. Although the one year olds presumably did not understand what they were hearing, their speech development at 20 months of age was advanced beyond that of comparison group which had not been read to by their mothers.

Both of these studies used a simple criterion to judge the type of interaction between mother and child; either the mother read to the child or she did not. This distinction is useful but the interaction between mother and child is more complicated than such a simple dichotomy. Simply because a mother reads to her child does not mean that the quality of the relationship is optimal for developing positive attitudes towards books and reading. If the child is forced to listen to this mother read, or if his mother views the process as a bother, then the interaction might be a negative rather than a positive influence in developing the child's attitudes towards reading and books. It is important that a distinction be made between quality and quantity.

At children's earliest ages, parents seem most successful when provided with information on child development and activities useful at certain stages of children's development. With preschoolers, the research supports reading aloud to children, encouraging exploration of the concrete world, and expanding children's experiences through trips, home activities, and viewing and discussing television together. When children enter school, parents can pursue supplementary activities sent home by teachers for the first three grades and reinforce school activities for the remaining grades. Throughout their children's growing years, parents of the most successful children model behaviors most likely to help them do well – being hardworking and active, doing their best, putting work before play, and stressing self-discipline. Other helpful parent characteristics include being interested in children's interests, listening to children, being responsive to them, and respecting children even when they make mistakes.

[See the whole paper.](#)



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The Impact of Language Development on the Psychosocial and Emotional Development of Young Children.

Nancy Cohen

Language and communicative competence provide critical tools for learning, engaging in social relationships, and behavior and emotion regulation from infancy onward. Two domains are considered under the rubric of language: structural language and pragmatic communication. Structural language skills encompass the sounds of language (phonology), vocabulary (semantics), grammar (syntax and morphosyntax), narrative discourse, and auditory verbal information processing. Pragmatic language skills include behaviors such as conversational or other communicative turn-taking, making good use of gestures and maintaining eye contact. As well as these specific aspects of language and communication, children must be able to both express their thoughts (expressive language) and understand those of others (receptive language) in both social and learning situations.

When children have difficulty understanding others and expressing themselves, it is not surprising that psychosocial and emotional adjustment problems ensue. Conversely, a relatively large proportion of school-age children who have psychosocial and emotional disorders often have problems with language and communication.

Language development and impairment and their association with psychosocial and emotional development and disorder have been examined in cross-sectional and longitudinal studies of community and clinic (both speech-language clinic and mental-health clinic) samples ranging from infancy through adolescence. In these studies, aspects of language and skills with which language and communication are associated have been examined.

Researches have found that from infancy onward, language and psychosocial and emotional development are interrelated. Communication begins in the very first days of life. Potential problems that begin in relationships with parents can ultimately spiral as children enter school and have difficulty learning and getting along with teachers and peers. Even mild language impairments can have an impact on the course of development. Outcomes are worsened by the presence of co-occurring environmental stresses. Because language competence is critical for both school readiness and psychosocial and emotional adjustment, problems with language and communication can set a child on a maladaptive trajectory throughout life. Language problems can be subtle and may be overlooked in learning and therapeutic situations. Therefore, identification and assessment of language disorders, and intervention, are important in the early years, setting the stage for later competence in a broad range of areas. [See the whole paper.](#)



Learning Through Interaction: Volume 1: The Study of Language Development.

Gordon Wells

There have been many studies of children learning to talk, but perhaps none as comprehensive – in terms of the number of children involved, the period of continuous observation and the scope of the analysis – as the Bristol Study of Language Development. This is the first full-length volume to be written by members of the research team and it is a fundamental study of language development from infancy to primary school.

It synthesizes the research to date and discusses some key socio- and psycholinguistic themes with reference to transcribed excerpts from spontaneous conversations recorded by the team and to experimental data. The authors' central argument is that conversation provides the natural context of language development and that the child learns through exploring his world of interaction with other people. The quality of learning is seen to depend particularly on the strategies that adults employ to develop and extend children's contributions to interaction. This has important practical implications for the transition from home to school, and the second part of the book examines the differences and similarities between the talk that goes on in these two environments. The final chapter considers the development of literacy. The model of language development presented here will make stimulating and challenging reading for a wide range of sociologists, psychologists and educationalists as well as being of particular interest to linguists.

[See the whole paper.](#)



Interrelations of Language and Cognitive Development.

Gedeon O. Deák

For decades, researchers have debated and investigated the relationship between language and cognitive development, especially in infancy and early childhood. Modular perspectives posit that language development is controlled by specialized mechanisms, much like the olfactory system evolved to detect, learn, and process airborne particles. In this perspective, language learning might be quite independent of other cognitive abilities. By contrast, constructivist and biologically based perspectives tend to emphasize the progressive, experience-dependent emergence of complex skills, including language. These theories postulate that domain-general cognitive capacities and processes are recruited to develop language. The frameworks make distinct predictions: Modular theories expect language-specific learning processes and products. Constructivist and neuroconstructivist approaches expect language-learning processes and products to show deep commonalities with nonlinguistic learning.

A profound challenge in adjudicating between these views is that many capacities and skills change with age: Perceptual sensitivities change with practice, everyday experiences provide a ballooning data set for inductive inference and pattern detection, and incremental practice leads to improvement of all sorts of actions and cognitive skills. Another challenge is that methods and instruments for measuring linguistic and nonlinguistic cognitive skills are completely different between infancy and early childhood and also between early childhood and late childhood and adolescence. Thus, behavioral data cannot easily be compared across ages. Nevertheless, there is ample evidence of robust relations between language abilities and cognitive development, dating from the earliest research on child language in the 1970s.

A distinct but complementary question has been addressed for over a century by anthropologists, psychologists, and educators: How does language affect cognition? How, for example, does language processing facilitate attention, learning, memory, and reasoning? Both questions raise an ancillary question about whether specific cognitive or learning abilities evolved on the coattails of language evolution or whether language emerged as a coevolutionary by-product of hominin cognitive capacities and social structures. The former implies that some general cognitive abilities, such as music, are evolutionarily subordinate to language ability. The latter suggests that language, music, mathematics, and writing systems are diverse products of a set of cognitive and sociocultural traits common to humans. However, this question is a subject of speculation and not amenable to direct investigation. The following article reviews, first, how cognitive capacities relate to language development (broadly construed) and, second, how language development supports learning and cognition. [See the whole paper.](#)



Assessment of Cognitive and Language Abilities Through Play.

Carol Westby

Studies on language development during the 1970's have related certain cognitive attainments to certain features of language development. Although no one-to-one mapping of language onto cognition has been found, some cognitive abilities consistently precede or occur with certain communicative intentions and linguistic structures. Because of this interrelationship between cognition and language, the assessment of a child's language should include the assessment of cognitive level. Formal psychometric tests yield an estimate of some specific skills, but they do not assess all of the cognitive, representational, and thinking skills necessary for the use of language for communicative purposes.

The majority of language and visual-perceptual items on the Bayley Scales of Infant Development, the McCarthy Scales of Children's Abilities, and the Wechsler Intelligence Scale for Children-revised (WISC-R) might be acquired in stimulus-response training.

A child from a stimulating home environment, a preschool, or special education program has had training on the tasks presented on these tests, and therefore, when presented with the test items, he/she may have success. [See the whole paper.](#)



Becoming Brilliant. What Science Tells Us About Raising Successful Children.

Roberta Michnick Golinkoff & Kathy Hirsh-Pasek

In just a few years, today's children and teens will forge careers that look nothing like those their parents and grandparents knew. Even the definition of “career” and “job” are changing as more people build their own teams to create new businesses, apps, and services. Although these changes are well underway, our system of K-12 education in the United States lags behind.

Our education system still subscribes to the idea that content is king. The exclusive focus on content is reflected in what we test and how we teach, and even the toys we offer our children at home. Employers want to hire excellent communicators, critical thinkers, and innovators – in short, they want brilliant people. But they are often disappointed. So what can we do, as parents, to help our children be brilliant and successful? Stories about the failures of our educational system abound, but most of them stop after pointing out the problems. *Becoming Brilliant* goes beyond complaining to offer solutions that parents can apply right now. Authors Roberta Michnick Golinkoff and Kathy Hirsh-Pasek provide a science-based framework for how we should be educating children in and outside of school. Parents become agents of change for children's success when they nurture six critical skills.

Constructed from the latest scientific evidence and presented in an accessible way rich with examples, this book introduces the 6Cs – collaboration, communication, content, critical thinking, creative innovation, and confidence – along with tips to optimize children's development in each area.

Taken together, these are the skills that will make up the straight-A report card for success in the 21st century. [See the whole paper.](#)



The Relationship Between The Effects of Noise on Children at School: A Review.

Bridget Shield & Julie Dockrell

This paper reviews research on issues relating to the effects of noise on children at school. Areas covered include factors affecting speech intelligibility in the classroom; the effects of environmental and classroom noise on children's academic performance; children's annoyance due to noise; and surveys of classroom noise levels. Consistencies and discrepancies between the results of various studies are highlighted.

The research evidence shows that noise does have an effect on children's performance at school, with older children in the primary school age range appearing to be the most affected by noise. Children are also annoyed by noise at school. Measurement surveys of classrooms show that classroom noise levels can be high, particularly in classrooms without acoustic treatment, and that this is often due to the noise of classroom activity. One cause of the detrimental effect of noise is the degradation of speech intelligibility in the classroom. The precise nature of the effects of noise upon the cognitive processes of children, however, is as yet not fully understood. There is increasing awareness among the architectural, educational and acoustical professions about the effects of noise on children and the need to create good acoustic conditions in the classroom. This is being reflected in current national and international standards on classroom acoustics.

[See the whole paper.](#)



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IU Study Finds Infant Attention Span Suffers when Parents' Eyes Wander During Playtime.

Chen Yu & Linda Smith

The ability to sustain attention is a major achievement in human development and is generally believed to be the developmental product of increasing self-regulatory and endogenous (i.e., internal, top-down, voluntary) control over one's attention and cognitive systems [1-5]. Because sustained attention in late infancy is predictive of future development, and because early deficits in sustained attention are markers for later diagnoses of attentional disorders [6], sustained attention is often viewed as a constitutional and individual property of the infant [6-9]. However, humans are social animals; developmental pathways for seemingly non-social competencies evolved within the social group and therefore may be dependent on social experience [10-13]. Here, we show that social context matters for the duration of sustained attention episodes in one-year-old infants during toy play. Using head-mounted eye tracking to record moment-by-moment gaze data from both parents and infants, we found that when the social partner (parent) visually attended to the object to which infant attention was directed, infants, after the parent's look, extended their duration of visual attention to the object. Looks to the same object by two social partners is a well-studied phenomenon known as joint attention, which has been shown to be critical to early learning and to the development of social skills [14, 15]. The present findings implicate joint attention in the development of the child's own sustained attention and thus challenge the current understanding of the origins of individual differences in sustained attention, providing a new and potentially malleable developmental pathway to the self-regulation of attention. See the whole paper.



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Studying Learning in the Womb.

Gina Kolata

Research scientists who study the behavior of human infants believed until recently that the baby's world was characterized largely by utter confusion. However, new research has emerged that paints a different picture. Babies have been shown to respond to their environment from the first day of postnatal life. They can discriminate between objects that they see and can even recognize their mother's voice. This relatively new body of data indicates that the learning begins before birth. This idea suggests a whole series of questions about how and when an unborn baby can learn.

So far, studies of in utero learning are mixed. One group of investigators is looking at the abilities of human babies to recognize voices and even poems that they first heard before they were born. Others are studying classical conditioning in fetal rats and mice. Still another research has a new way of observing fetal sheep that should facilitate research on in utero learning. Nonetheless, what each of these investigations is finding is that every time they look for fetal learning, it is there.

Anthony DeCasper, a psychologist at the University of North Carolina in Greensboro, says he began his studies of fetal learning a few years ago when he wondered why newborn human babies perceive sound so well. DeCasper and his team tested newborn babies with a system in which the babies could suck on a nipple that was attached to a tape recorder. By sucking in one pattern of longer and short sucks, a baby would hear its own mother's voice and by sucking another way the baby would hear another woman's voice. The babies, DeCasper found, tended to suck so as to hear their own mothers.

What is most significant about this surge of research on fetal learning is that the experiments are rigorous and controlled and are being done by scientists who are experienced at looking at the behavior of both infant and adult animals. As researchers explain, for those who want to study the origins of behavior, in utero learning is the new frontier. [See the whole paper.](#)



For even more information, call (650) 862-7479 or email jon@versame.com

Better Baby Communication: Has Natural Selection Wired Your Brain for Baby Talk?

Gwen Dewar

The behavior of newborns suggests that babies are born with an unlearned preference for infant-directed speech. Baby communication that happens along several channels, including those of sight and touch. It discusses the most obvious way that parents communicate with their infants in that of simply talking to them. Call it “motherese,” or “infant-directed speech” (IDS), this style of speaking isn’t about repeating nonsense words or imitating the baby’s attempts to talk but rather it’s about using the same words we use in regular speech, but with distinctive modifications that make the message more clear.

Research has found that the newborns turn their heads longer in response to infant-directed speech. Similar experiments have been performed on older babies, with the same results. In one study, five-month-old babies showed a preference for strangers who addressed them with infant-directed speech, even after the talking had ended.

From these findings, it becomes evident that infant-directed speech evolved to facilitate baby communication. It’s a tutorial style of speech, one designed to help babies learn language, forge stronger emotional attachments, and develop better social skills. Does this imply that infant-directed speech is a kind of “tutorial” mode of baby communication? It seems to. In fact, there is even evidence suggesting that babies learn speech faster when their parents use particularly expressive forms of infant-directed speech. [See the whole paper.](#)



Adult-Child Discourse: Developmental Interaction Between Information Processing and Linguistic Knowledge.

Lois Bloom, et. al.

In the present study, the discourse interaction between adult and child was examined in terms of the content of their utterances, and the linguistic and contextual relations between their messages, in order to investigate how children use the information from adults' input sentences to form contingent responses. The analyses described were based on longitudinal data from four children from approximately 21 to 36 months of age. Categories of child discourse, their development and their interactions with aspects of prior adult utterances form the major results of the study. Child utterances were identified as adjacent (immediately preceded by an adult utterance), or as nonadjacent (not immediately preceded by an adult utterance). Adjacent utterances were either contingent (shared the same topic and added new information relative to the topic of the prior utterance), imitative (shared the same topic but did not add new information), or noncontingent (did not share the same topic). From the beginning, the adjacent speech was greater than nonadjacent speech. Contingent speech increased over time; in particular, linguistically contingent speech (speech that expanded the verb relation of the prior adult utterance with added or replaced constituents within a clause) showed the greatest developmental increase. Linguistically contingent speech occurred more often after questions than nonquestions. The results are discussed in terms of how the differential requirements for processing information in antecedent messages is related to language learning. [See the whole paper.](#)

