Course #: PSY 1617

Course Title: Language Development in the First Few Years of Life

Course Description:
How do infants first learn the sounds that make up their native language? By what process do babies begin to understand and assign meaning to words? What allows young children to intuitively grasp the complex rules of grammar? This course will explore these questions and more as we delve into the fascinating research on one of the fundamentally unique abilities of our species: learning language. Since young children understand more than they can say, we will also cover how researchers figure out what kids know, based on naturalistic recordings and short in-lab experiments. For psychology concentrators and students on the Cognitive Science track of affiliated departments under the Mind Brain Behavior initiative, this discussion-based seminar offers an in-depth examination of the complex yet foundational processes by which we master our very first forms of communication.

The Psychology Department requires completion of Psychology 1 or the equivalent of introductory psychology (e.g. Psych AP=5 or IB =7 or Psyc S-1) and at least one foundational course from PSY 14, PSY 15, PSY 16, or PSY 18 before enrolling in this course; or permission of instructor.

General Information:

Units:	4
Semester:	Fall, 2024
Location:	William James Hall, Rm 303
Time:	Wednesdays, 12:45-2:45pm

Professor:	Dr. Elika Bergelson
Email:	elika_bergelson@fas.harvard.edu
Office Hours:	TBA & by appointment.
Office Location	William James Hall, rm 1170 (+ zoom if needed)

Learning Objectives:
After taking this course, students will be able to:
a) Read and discuss original research on language development by distinguishing and describing key hypotheses and debates
b) Describe and evaluate available methods for testing infants and toddlers on their tacit and productive knowledge across various domains in psychological science and language research
c) Design a well-thought-out proposal for a new set of studies in language development
d) Critique media reporting on scientific results

Accommodations Statement:
Harvard University values inclusive excellence and providing equal educational opportunities for all students. Our goal is to remove barriers for disabled students related to inaccessible elements of instruction or design in this course. If reasonable accommodations are necessary to provide access, please contact the *Disability Access Office* (DAO). Accommodations do not alter fundamental requirements of the course and are not retroactive. Students should request

accommodations as early as possible, since they may take time to implement. Students should notify DAO at any time during the semester if adjustments to their communicated accommodation plan are needed.

Expectations:

Attendance

You should attend every session of this in-person class if you are healthy. With the exceptions below, if you miss a class, for whatever reason, you are still responsible for turning in any assignments on time, and for the content that was covered. Occasionally, it is necessary to miss a class for a rare and valid reason, such as a health concern, or an important religious observance, or travel to an academic event. For planned events (i.e. religious holidays or academic conferences), please contact me by the end of the second week of class to ensure we plan accordingly. Beyond this, Harvard's attendance policies, detailed in the handbook, apply.

Electronic Devices

(adapted from Dr. Bridgette Hard, Director of UG Studies, Psychology & Neuroscience, Duke)

Active use of laptops and other technology (e.g., cell phones) is not permitted during class. This policy is based on careful analysis of the scientific literature, which shows that using a laptop in class is associated with poorer grades for both laptop users and for their neighbors.

If you feel strongly that not using a laptop will impair your learning in this class, you should reach out to me to discuss your needs. Anyone seen using a laptop/tablet in class must have instructor approval and a signed agreement indicating that the laptop will be used exclusively for notetaking. Cell phones are not to be out during class.

Please reach out if you need tips or advice for effective notetaking! The ARC has great resources for this (https://academicresourcecenter.harvard.edu/resources/strategies-for-learning/) and I am happy to discuss further!

I understand that there are occasional urgent events needing your attention. If you are expecting an important message during class that requires you to check your phone, talk to me in advance.

Readings: to print or not to print

It is your choice whether to print out our course readings or to read them digitally. **That said, I recommend having a copy of the articles with you during class, especially if you're the discussion captain**. I point you to empirical research suggesting that digital-only is neither clearly 'greener' nor better for learning.

* The Reading Brain in the Digital Age: The Science of Paper versus Screens
https://www.scientificamerican.com/article/reading-paper-screens/#
* Print or Digital: It All Has Environmental Impact
http://www.huffingtonpost.com/omega-institute-for-holistic-studies/print-or-digital_b_4860403.html

That said, some articles have color figures that require viewing in color to understand, so keep this in mind if you are printing (and do print double-sided if you go that route!)

Meeting with Dr. Bergelson (instead of emailing)

I want you to succeed in this course, and in your educational endeavors. If you find yourself struggling in any way, I implore you to come and talk to me about it, the sooner the better. There are *lots* of resources at Harvard for e.g. accommodations for learning disabilities, help with

studying and navigating primary source material, mental health resources, harassment concerns and beyond. I will either be able to help you myself or refer you to a resource that can.

Relatedly, if something in class really sparks your interest and you want to go beyond what we cover, let me know that too and we can see how you can get plugged in to more information, research on the topic, etc.

One big regret that students often voice is that they didn't actually interact one-on-one with their professors. To help with this, I use email in my teaching only to set up appointments to meet or to receive mandatory communication about absence (see above). My standing office hours are **XXX**. You do not need to make an appointment to come see me at that time or to email me and see if it's okay: just come. If you need to meet in private, please let me know in advance. **If you'd like to meet but cannot come during office hours, email me with 3 suggested times**.

Academic Resource Center (ARC)
Harvard's ARC offers free services to students. Particularly relevant resources include support under topics like: Transitioning to Harvard, Strategies for Learning, Engaging with Courses, Planning and Organizing, and Self-Regulation. They offer academic coaching, accountability groups, peer tutoring, and workshops. Take advantage of this student support!

Location: 1414 Massachusetts Avenue, Floor 3R, Cambridge, MA, 02138 (*Located in the Bank of America building next to the Coop; (use HUID to access the elevator))*
1-on-1 appointments can also be booked online
Hours of Operation: Monday-Friday: 9:00 a.m. – 5:00 p.m.
academicresourcecenter@harvard.edu

Assignments:

1) Language Development in the News (LDN)

We will do two rounds of this assignment, once at the beginning of the semester when you are new to reading about language development, and once at the end when you're an expert. Each time, your task is to:

I) *find* a news article about language development from popular media (e.g. NY Times, CNN, the Atlantic, etc.)

II) *claim* it on our shared google doc (link to be posted on canvas). **Only one person can use a given primary source or pop article per class,** so e.g. if two pop articles write up the same primary source article, whoever claims it first, gets it (repeaters will lose 5 points)

III) *read* the news article and 1 or 2 of the cited empirical articles

IV) *rate* the pop piece according to Politifact's 'truth scale,' from true to pants on fire: https://www.politifact.com/article/2018/feb/12/principles-truth-o-meter-politifacts-methodology-i/#Truth-O-Meter%20ratings

Round 1: write a 1-2 page (single spaced) essay that analyzes how well the pop piece did in representing the findings. To do this, you'll want to discuss what the study found, how the news article described it, what got glossed over, misrepresented, or properly diffused for a casual reading audience. Don't forget to cite your sources!
You will submit your Round 1 LDN paper, via Canvas, by 11:59pm on 9/12. Please title the document "LDN1."

Round 2: present. For your second LDN, instead of writing an essay, you'll present your findings to the class in a short google slides presentation, covering the same content described for the written version above.
You will present your Round 2 LDN in our last class on 12/4.

2) Discussion Questions (2x/week) [see separate handout & grading details below]
To foster discussion, you will submit 2-3 (non-clarification) questions about each of the assigned readings **by 6pm Friday for the (a) readings and 6pm Tuesday for the (b) readings**, via Canvas (where I'll post a googlesheet). These should be thoughtful questions that will elicit debate, and have non-straightforwardly-google-able answers.
Students must submit 2 discussion questions for each article (except the ones they captain)

Your questions should not repeat what others have already said, though you may reply to or follow up on others' questions with your own questions or comments. (**Hint**: posting your questions earlier increases the chance that someone won't have already come up with the same question). Your question should clarify what drives your question or why you're asking.

3) Discussion Captaining [see separate handout & grading details below]
At the beginning of each class, we'll determine which student is the "***discussion captain***" for each of the following week's (a) and (b) articles. Discussion Captain duties are:

1. read others' questions, concatenate them into a single document and send to Dr. Bergelson **via email** (elika_bergelson@fas.harvard.edu) by **11:59pm** the day before they captain
2. structure a discussion plan around them
3. summarize the paper in <5minutes (no slides; can bring notes/article printed out)
4. keep the discussion going for ~15min, calling on students as needed.

There are ~8 extra readings over the course of the semester that are *optional* and will generally not have a captain (time permitting, I will summarize them, with the opportunity for any students who did read them to chime in).

N.B. You do not need to post questions about the articles you captain, since successful captaining will provide evidence you read and pondered the article.

4) Methods and Questions [see further hints in Assignment tab on Canvas]
One goal of this class is to familiarize you with methods and questions used in studying language development. To that end, your mid-term assignment will require you to:

a) Make a visual representation (e.g. table, powerpoint slides, etc.) summarizing 8 of the methods/paradigms/tools in language development we cover in weeks 1-9 (e.g. head-turn preference procedure, looking-while-listening, MacArthur-Bates Communicative Development Inventory):

For each, you should state:
1. How the method works
2. Age-range it applies to
3. What kinds of questions it can answer
4. What the limitations of the method are
5. Papers we read or discussed that used it

N.B. no external sources required but if you use them (which you're welcome to, if cited!), be wary because some will describe or label methods differently than we do in class.

And

b) Pick 5 of the 2 'header' guiding questions for each set of readings below and answer them based on your understanding of the articles and our class discussion.
1-2 paragraphs per question. Strong answers will incorporate all readings under the header subsection.

You will submit your Methods & Questions Assignment, via Canvas, by 11:59pm on Monday 10/21. Please title it 'methods_questions.pdf'

5) Final Project: Mini-Grant Poster Pitch [see separate handout]
You will pitch a research proposal for a set of experiments in the field of language development (or an interdisciplinary project with a significant language development component). The format of this poster will be similar in spirit to a grant proposal, including the following sections:

I) Background & Significance [as bullet points]
II) Methods [with diagrams and key details, can also be nested within III]
III) Proposed Experiments (3-5 experiments)
  i. Hypotheses tested
  ii. Experimental Design
  iii. Predicted Results (with mock-up graphs!)
  iv. Limitations
IV) Impact: what would this tell us and why do we care?

Optional: you may submit a preliminary draft for feedback by **11:59pm Monday 11/25 via Canvas**, which I will return to you with general comments by 11:59pm Monday 12/2.

You will submit your poster file, via Canvas's Assignment tab, by 11:59pm on Sun 12/8. Please title it 'minigrant' e.g. 'minigrant.pptx'.

You will present this poster to me in a 10min presentation +Q&A you sign up for at the end of reading period. This will be done in the Bok Center's Learning Lab and recorded on Dec 9/10.

You will submit your reflections on how the pitch went by 11:59pm on the day of your presentation via Canvas's Assignment tab titled 'reflections.docx.'

Grading:
I want you to get an A, and you want you to get an A.
If you come to class and participate, do the readings, and invest sufficient time and effort on the assignments to reveal what you've learned, we'll both get what we want.

Your grade is calculated as follows:

5% LDN Round 1 (paper)
5% LDN Round 2 (presentation)
20% Methods & Questions Assignment
30% Final Poster Pitch

10% Participation in Class Discussion (3 points/class)
15% Questions on readings (10 points/class)
15% Discussion Captain Assessment (15 points/captain-ship)

For items in **bold**, you will get a score out of 100, which is weighted by the percentage shown. For the items not in bold, you will receive points as indicated, which will then be averaged and weighted by the indicated percentage. More specifically:

Participation: up to 3 points/class:

- 1/3: present and alert; 2/3: spoke 1x; 3/3 actively engaged with others' ideas/article

Discussion Questions on readings: up to 10 points/class:

- For each class, I randomly pick your questions for 1 of the readings from each set and give you a score out of 10 (see Discussion Question Requirement Details doc on Canvas for more info); I read all questions.

Discussion Captain Assessment: up to 15 points/captain-ship
(~XXx/semester, depends on class size)

- Score based on your captain document & discussion leading, see Captain Requirement Details doc on Canvas for more info

Late Assignment Policy: Outside of extenuating circumstances, I will not accept a late LDN, Methods & Questions, or Final Pitch. Such circumstances require the involvement of your resident dean. Similarly, without extenuating circumstances confirmed by your resident dean, your final pitch will be docked 10% for every 24 hours past the deadline that it is submitted up to 72 hours; assignments received >72 hours late get a zero.

That said, I get that life can throw us curveballs and I am much more likely to be able to consider special situations if you come talk to me about any difficulty you're having **before** a deadline (for small assignments >24 hours before it's due, for final projects, at least 1-2 weeks). I strive to balance this with fairness to other students.

N.B. There is a separate late assignment policy for discussion question posting, see handout.

Grading Scale (*N.B.: I round to the nearest tenth. i.e. 89.9 = B+. Non-negotiable.)*
92.0-100: A
90.0-91.9: A-
88.0-89.9: B+
82.0-**8**7.9: B
80.0-**8**1.9: B-

(Progressively subtract 1 from the bolded digits above for analogous grades for the C, D, and F range. Anything below 50.0 is also an F.)

Honor and Academic Integrity

I take academic honesty extremely seriously and expect you to do the same. Indeed, I am *obligated* to report *any suspected academic dishonesty* to the Office of Academic Integrity and Student Conduct. Plagiarism is the biggest risk area; I encourage students to consult Harvard's plagiarism resources: (https://usingsources.fas.harvard.edu/how-avoid-plagiarism/) to ensure you are not at risk of violating our policies. This includes:

- using others' words as your own without citations or appropriate paraphrasing
- failing to quote or provide citations when they are needed

Use of AI tools. Tools like chatGPT are not necessary for succeeding in this course, and will generally weaken your course performance and grade. *Any use must be appropriately acknowledged and cited. It is each student's responsibility to assess the validity and applicability of any GAI output that is submitted; you bear the final responsibility. If there is a concern regarding uncited use or overreliance on such tools, I may ask students follow-up questions on assignments to confirm their independent knowledge regarding their assignments' content.*
Violations of this policy are considered academic misconduct.

Collaboration
Science is collaborative and while you are welcome to discuss your ideas and presentations with others and with me, the final product should reflect **your independent** work. If you're unclear on this, please discuss with me ahead of due dates.

Class	Date	Due Dates/Notes	Guiding Questions
1	9/4		1a: Intro Part 1: What's there to learn about language?
			1b: Intro Part 2: What's there to learn about developing human infants?
2	9/11	**LDN Round 1 due Thursday 9/12 @11:59pm**	**2a: An Introduction to some intriguing cases of language learning** What aspects of language learning are biological vs. environmental, and how do we know?
			2b: Phonetic Learning: Discriminating Sounds How does language-specific sound perception begin, & how does social feedback matter?
3	9/18		**3a Learning from Familiar Distributions** How can infants use familiar speech sound distributions to learn about word & wordforms?
			3b Word Form Representations What do infants know about words they've heard regularly and how can we tell?
4	9/25		**4a Stat & Rule learning** What kinds of learning mechanisms can infants use, in principle?
			4b Gesture & Language What is the nature of the links between early language and gesture ability, and how do we know?
5	10/2	Rosh Hashanah begins evening 10/7 add/drop deadline	**5a Early Word Learning: Perceptual and Non-perceptual Categories** What evidence is used to argue early that word learning has perceptual vs. abstract/social bases?
			5b Earli(er) Word Learning What have infants learned when first they understand words?
6	10/9	(midterm progress reports if needed)	**6a Role of Audition** What aspects of spoken language learning are affected by being deaf or hard of hearing?
			6b Sign language Why are (new & existing) sign languages an important lens for understanding language development
7	10/16	Mid-sem course eval **Methods & Qs due Mon 10/21 @11:59pm**	**7a Predictive Listening** What kinds of expectations do children have as sentences unfold?
			7b Links in the Lexicon How do known words influence new word learning?
8	10/23		**8a Bilingualism** What is different about linguistic and non-linguistic abilities in bilinguals?
			8b Bilingualism & Early Second Language Exposure How does early exposure to a second language alter cognition and later language learning?
9	10/30		**9a Early Syntax Knowledge** What is the nature of toddlers' syntactic competence?
			9b More early syntax What kind of evidence is there for abstract syntactic structure in young children?
10	11/6		**10a Input Description and potential sequelae** How can we quantify young children's language input and what they've learned from it?
			10b Input, SES, & language comprehension How are socioeconomic status, language input, and language knowledge linked in early childhood?
11	11/13	UG withdraw deadline 11/18	**11a Referential Acts/Perspective-Taking** In what ways do and don't young children take others' point of view into consideration

			11b Cross-linguistic Differences How do different languages encode meaning differently?
12	11/20	**draft by 11/25 (opt'l)**	**12a Dev Disorders** How do developmental disorders disrupt language learning?
			12b Summary How does it all fit together?
Thanksgiving! No class 11/27			
13	12/4	**LDN Round 2 due in class 12/4**	**LDN Round 2**
	Exam	**Final pitch** due **12/8 @ 11:59pm**	

Weekly Readings

There are *4-5 articles* assigned for each class meeting (sometimes 6 if they're VERY short). These are split into 2 themes per class. There is no textbook.

I know if I assign too much reading, you won't do it.

I've curated the readings to be a mix of short and long articles, and I believe the assigned reading is the minimum fair reading load to ensure students can invest in the material and walk away knowing about language development. All readings are on Canvas.

N.B. I will spearhead the discussion for a few of the more difficult articles, and jump in as needed otherwise. Also, the shorter articles aren't always easier to foster discussion of: they're denser and may require the discussion captain to look up references, etc. We'll divvy up captaining as fairly as possible.

Background Reading:

If you've never had a linguistics class, consider the Stillings chapter for background knowledge; the material covered there, though a bit dense, will give a solid background for understanding the language development research we'll be covering this seminar. If in contrast, you're newer to psychology, the Gleitman chapter is an easy breezy read that will get you up to speed, indeed.

Stillings, N. A. et al. 1995. Linguistics: The representation of language chapter 6 215-268. In *Cognitive science: An Introduction*, second edition. Bradford Book, MIT Press

Gleitman, L. 2009. Chapter 10: Language. In Gleitman, H, *Introduction to Psychology,* 8th edition. Norton, 2011.

I'm also including on Canvas a reading about how to read journal articles:
Optional but highly recommended:
Roediger & Gallo, 2004, Appendix: How to read an article in Cognitive Psychology

Required Readings (to be read *before* class):

1A: Introduction to Language

What's there to learn about Language?

no mandatory reading (Optional but highly recommended: Stillings, 1995))

1B: Introduction to Development

What's there to learn about developing human infants?

no mandatory reading (Optional but highly recommended: Gleitman, 2009, Chapter 10)

2A: An Introduction to some intriguing cases of language learning:

What aspects of language learning are biological vs. environmental, and how do we know?

1. Gleitman, L. R., & Newport, E. L. (1995). The invention of language by children: Environmental and biological influences on the acquisition of language. *An invitation to cognitive science*, *1*, 1-24.
2. Vouloumanos, A., & Waxman, S. R. (2014). Listen up! Speech is for thinking during infancy. *Trends in Cognitive Sciences, 18,* 642-646.
3. Optional: Newport, E. L. (1990). Maturational constraints on language learning. *Cognitive science*, *14*(1), 11-28.

2b. Phonetic Learning: Discriminating Sounds

How does language-specific sound perception begin, and how does social feedback matter?

1. Werker, J. F., & Tees, R. C. (1984). Cross-language speech perception: evidence for perceptual reorganization during the first year of life. *Infant Behaviour and Development, 7,* 49–63.
2. Kuhl, P.K., Tsao, F., & Liu, H. (2003). Foreign-language experience in infancy: effects of short-term exposure and social interaction of phonetic learning. *PNAS, 100,* 9096-9101.

3A: Learning from Familiar Distributions of Sounds

How can infants use familiar speech sound distributions to learn about words & wordforms?

1. Babineau, M., Shi, R., & Christophe, A. (2020). 14-month-olds exploit verbs' syntactic contexts to build expectations about novel words. *Infancy*, *25*(5), 719-733.
2. Bortfeld, H., Morgan, J. L., Golinkoff, R. M. & Rathbun, K. 2005 Mommy and me: familiar names help launch babies into speech-stream segmentation. Psychol. Sci. 16, 298– 304. (doi:10.1111/j.0956-7976.2005.01531.x)
3. Optional: Jusczyk, P. W., Cutler, A., & Redanz, N. J. (1993). Infants' preference for the predominant stress patterns of English words. *Child development*, *64*(3), 675-687.

3B: Word Form Representations

What do infants know about words they've heard regularly and how can we tell?

1. Jusczyk, P.W. & Hohne, E.A. (1997). Infants' memory for spoken words. *Science, 277,* 1984-1986.
2. Swingley, D., & Aslin, R. N. (2002). Lexical neighborhoods and the word-form representations of 14-month-olds. *Psychological science*, *13*(5), 480-484.

4a. Stat & Rule learning

What kinds of learning mechanisms can infants use, in principle? (one captain for 1&2)

1. Aslin, R.N., Saffran, J.R., & Newport, E.L. (1998). Computation of conditional probability statistics by 8 month-old infants. *Psychological Science, 9,* 321-324.
2. Lew-Williams, C., Pelucchi, B., & Saffran, J. R. (2011). Isolated words enhance statistical language learning in infancy. *Developmental Science*, *14*(6), 1323-1329.
3. Marcus, G. F., Fernandes, K. J., & Johnson, S. P. (2007). Infant rule learning facilitated by speech. *Psychological Science*, *18*(5), 387-391.
4. Forgács, B., Tauzin, T., Gergely, G., & Gervain, J. (2022). The newborn brain is sensitive to the communicative function of language. *Scientific Reports*, *12*(1), 1220. https://doi.org/10.1038/s41598-022-05122-0

4b. Gesture & Language

What is the nature of the links between early language and gesture ability, and how do we know?

1. Rowe, M. L., Wei, R., & Salo, V. C. (2022). Early gesture predicts later language development. In A. Morgenstern & S. Goldin-Meadow (Eds.), *Gesture in language: Development across the lifespan* (pp. 93–111). De Gruyter Mouton; American Psychological Association. https://doi.org/10.1037/0000269-004

2. Iverson, J. M., & Goldin-Meadow, S. (2005). Gesture paves the way for language development. *Psychological science*, *16*(5), 367-371.

5a. Early Word Learning: Perceptual and Non-perceptual Categories

What evidence is used to argue that early word learning has perceptual vs. social or abstract bases?

1. Bloom, P. (2001). Précis of how children learn the meanings of words. *Behavioral and Brain Sciences, 24,* 1095-1103.
   N.B.: also skim 1-2 replies listed below*: Bikerton, Gogate, Hirsh-Pasek et al, Keil, Maratsos, Murphy, Naigles, Nelson, Tomasello, Waxman, Xu & Tenenbaum, and Bloom's reply to the replies at the end*
2. Smith, L.B., Jones, S.S., Landau, B., Gershkoff-Stowe, L. & Samuelson, L. (2002). Object name learning provides on-the-job training for attention. *Psychological Science, 13,* 13-19.
3. Yurovsky, D., & Frank, M. C. (2015). Beyond naïve cue combination: salience and social cues in early word learning. Developmental Science, 20(2), e12349. doi:10.1111/desc.12349
4. Optional Booth, A. E., Waxman, S. R., & Huang, Y. T. (2005). Conceptual information permeates word learning in infancy. *Developmental psychology*, *41*(3), 491-505
5. Optional: Markman, E. M. (1990). Constraints children place on word meanings. *Cognitive Science*, *14*(1), 57–77. https://doi.org/10.1016/0364-0213(90)90026-S

5b. Earli(er) Word Learning

What have infants learned when first they understand words?

1. Bergelson, E., & Swingley, D. (2012). At 6 to 9 months, human infants know the meanings of many common nouns. *Proceedings of the National Academy of Sciences of the USA, 109*, 3253-3258.
2. Yin, J., & Csibra, G. (2015). Concept-based word learning in human infants. *Psychological science*, *26*(8), 1316-1324.
3. Waxman, S. R., & Gelman, S. A. (2009). Early word-learning entails reference, not merely associations. *Trends in cognitive sciences*, *13*(6), 258-263.
4. Optional: Babineau, M., Barbir, M., de Carvalho, A., Havron, N., Dautriche, I., & Christophe, A. (2024). Syntactic bootstrapping as a mechanism for language learning. *Nature Reviews Psychology*, 1–12. https://doi.org/10.1038/s44159-024-00317-w

6a. Role of Audition

What aspects of spoken language learning are affected by being deaf or hard of hearing?

1. Oller, D. K., & Eilers, R. E. (1988). The role of audition in infant babbling. Child Development, 441-449.
2. Geers, A. E., Mitchell, C. M., Warner-Czyz, A., Wang, N. Y., Eisenberg, L. S., & CDaCI Investigative Team. (2017). Early Sign Language Exposure and Cochlear Implantation Benefits. *Pediatrics*, e20163489.

6b. Sign language

Why are (new and existing) sign languages an important lens for understanding language development?

1. Caselli, N., Pyers, J., & Lieberman, A. M. (2021). Deaf Children of Hearing Parents Have Age-Level Vocabulary Growth When Exposed to American Sign Language by 6 Months of Age. *The Journal of Pediatrics*, *232*, 229–236. https://doi.org/10.1016/j.jpeds.2021.01.029
2. Senghas, A., Kita, S. & Özyürek, A. (2004). Children creating core properties of language: evidence from an emerging sign language in Nicaragua. *Science, 305,* 1779-1782.
3. Goldin-Meadow, S. (2020). Discovering the Biases Children Bring to Language Learning. *Child Development Perspectives*, *14*(4), 195–201. https://doi.org/10.1111/cdep.12379

7a. Links in the Lexicon

How do known words influence new word learning?

1. Dautriche, I., Swingley, D., & Christophe, A. (2015). Learning novel phonological neighbors: Syntactic category matters. *Cognition*, *143*, 77-86.
2. Barbir, M., Babineau, M. J., Fiévet, A.-C., & Christophe, A. (2023). Rapid infant learning of syntactic–semantic links. *Proceedings of the National Academy of Sciences*, *120*(1), e2209153119. https://doi.org/10.1073/pnas.2209153119

3. Srinivasan, M., Al-Mughairy, S., Foushee, R., & Barner, D. (2017). Learning language from within: Children use semantic generalizations to infer word meanings. *Cognition*, *159*, 11-24.

7b. Predictive Listening

What kinds of expectations do children have as sentences unfold?

1. Lew-Williams, C., & Fernald, A. (2007). Young children learning Spanish make rapid use of grammatical gender in spoken word recognition. *Psychological Science*, *18*(3), 193-198.
2. Ferguson, B., Graf, E., & Waxman, S. R. (2014). Infants use known verbs to learn novel nouns: Evidence from 15-and 19-month-olds. *Cognition*, *131*(1), 139-146.
3. Mahr, T., McMillan, B. T., Saffran, J. R., Weismer, S. E., & Edwards, J. (2015). Anticipatory coarticulation facilitates word recognition in toddlers. *Cognition*, *142*, 345-350.

8a. Bilingualism

What is different about linguistic and non-linguistic abilities in bilinguals?

1. Byers-Heinlein, K., & Werker, J. F. (2009). Monolingual, bilingual, trilingual: infants' language experience influences the development of a word-learning heuristic. *Developmental Science*, *12*(5), 815-823.
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