Small Big Ideas Matter! Recursion as a Path to Educational Equity in Early Childhood

Written on behalf of the Language Acquisition Lab

Authored by Stacy Shang

December 15, 2025

The Language Acquisition Lab
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Monday, December 15, 2025

The Spencer Foundation
625 N Michigan Ave, Suite 1600
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Dear Board of Trustee members,

I submit this proposal for the Spencer Foundation Small Research Grant on Education on behalf of the Language Acquisition Lab. As part of the Linguistics Department at the University of Massachusetts Amherst, the Lab conducts experimental research to answer the most pressing research questions children gain the ability to use and understand language. Currently, the Lab seeks to respond to disparities in the development of higher-level thinking skills that are currently limited to affluent, predominantly white communities. The Lab proposes *recursion*, a critical concept underlying language, mathematics, and computational reasoning, as a missing link in early childhood education that may help bridge this gap in cognitive development.

The Lab requests a total of $50,000 from the Spencer Foundation over the course of a year to fund the development and implementation of a pilot study on the effects of exposure to recursion-based curriculum during early childhood education. Families will assist in co-designing activities that will engage children in playful, culturally responsive learning of recursion. Once developed, the curriculum will be piloted on preschool-aged children from our partner sites.

The data from the pilot study will guide future large-scale implementation, allowing for greater access to mastery of a skill that is vital to students' future success. We believe this research aligns with the Spencer Foundation's goals of improving and expanding access to education. Thank you for your time and consideration. We look forward to further connecting with you about the proposed program.

Sincerely,
Stacy Shang

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1. Statement of the Problem

A. Gap in Higher-Order Reasoning Skills

In recent years, students graduating from high school are finding themselves increasingly underprepared to navigate life in higher education and the professional world. Technological developments are perpetually reshaping academia and the workplace, and students are ill-equipped with the problem-solving and reasoning skills necessary to keep up. ACT test score data from 2023 show that fewer than one in six high school graduates meet STEM College Readiness Benchmarks. This downward trend only exacerbates the effects of pre-existing disparities in education; resources that promote higher-order thinking, such as extracurricular activities and enrichment programs, remain inaccessible to most children of color and children from low-income families.

B. Role of Recursion in Education

The Language Acquisition Lab at the University of Massachusetts Amherst points to a missing link in early learning that may be connected to this issue: *recursion*. Recursion is the ability to embed structures within similar structures, and is an essential component to understanding concepts in fields such as computer science, mathematics, and linguistics. In terms of computer science and mathematics, recursion is the process of solving a computational problem by repeatedly solving smaller instances of the same problem embedded within one another. In terms of linguistics, recursion is the embedding of similar sentence structures within one another. The sentence “Mike’s sister’s friend’s dog’s toy is broken” exemplifies possessive

recursion. Adjectives can be applied recursively, as seen in the sentence “The big round red cherry sat on top of the cupcake,” as well as clauses: “I told my teacher that Tommy whispered to Sarah that the dog ran outside.” Recursion is an essential facet of all languages for comprehending complex syntactic structures.

C. Disparities in Access to Recursion-Based Learning

Despite being a vital skill underlying language and reasoning, recursion is rarely ever explored explicitly in early childhood settings. Programs that encourage recursive thinking, such as coding and robotics programs, are primarily offered to children of privileged communities. Affluent, predominantly white children from families earning over $75,000 a year are three times more likely to access computer and math enrichment programs than Black and Latino children from families with annual income under $25,000. Instead, children from communities of color encounter deficit-oriented curricula that delays higher-order reasoning (Anyon, 1980; Dutro & Selland, 2012). As a result of the lasting impacts of systemic racism, students from underserved communities are left behind in the development of a critical cognitive skill that sets them up for future success, in education and beyond.

2. Statement of Request

The Language Acquisition Lab requests a total of $50,000 dollars from the Spencer Foundation to support a one-year study to develop and pilot-test a recursion-based curriculum. The pilot study aims to analyze the effects of exposure to recursion on preschool-aged children, ages 3-5, from predominantly Black, Latino, and low-income communities in Western Massachusetts. Through partnership with Head Start of Greater Holyoke, Springfield Public Schools Early

Learning Centers, we will engage 60 children and 30 families as curriculum co-designers and initial participants. Educators from the Children's Museum at Holyoke will also participate in material development to benefit their guests.

The University of Massachusetts Amherst holds 501(c)(3) tax-exempt status under IRS determination.

3. Project Rationale

A. Summary of Relevant Literature

The scientific study of language, linguistics, has established recursion as core to human language and cognition (Chomsky, 1957; Hauser, Chomsky, & Fitch, 2002). Recent studies on the Recursive Set-Subset Ordering (RSSO) Constraint demonstrate that monolingual and bilingual children handle multi-level recursive structures from age 4 (Bleotu et al., 2024; Lakshmanan et al., 2024; Pérez-Leroux et al., 2017), with children and adults observing structure-dependent principles across diverse linguistic contexts (Foucault et al., 2021, 2022, 2025; Bleotu & Roeper, 2021a, 2022a). Moreover, visual representations of recursion have been successfully used to scaffold learning, with young children outperforming older peers without scaffolds (Foucault et al., 2023).

However, purposeful experiences with recursion remain concentrated in privileged contexts. Children from low-income families and communities of color face "basics first" curricula delaying higher-order thinking (Anyon, 1980; Dutro & Selland, 2012). We aim to open the gate to, and

spotlight, recursion: it is developmentally appropriate and culturally universal, yet systematically denied to marginalized communities.

B. Project Contribution to Knowledge and Education

This project contributes new knowledge by: (1) providing the first systematic investigation of how brief, playful recursion experiences work with young children from diverse backgrounds; (2) documenting cultural adaptations needed for accessibility in communities of color; (3) examining whether recursion experiences in one domain support understanding in others; and (4) generating proof-of-concept data for curriculum designed for under-resourced settings.

For educational improvement, this research will: (1) produce evidence-based, culturally responsive curriculum materials freely available to practitioners; (2) challenge deficit narratives by demonstrating children from all backgrounds engage in sophisticated cognitive thinking; (3) identify implementation barriers and community-validated solutions; and (4) establish feasibility for larger-scale research on equitable access.

C. Conceptual Framework

Universal Grammar and Linguistic Theory: Our work builds on generative linguistics' research into recursion as fundamental to human language and cognition (Chomsky, 1957; Hauser et al., 2002), with recent set-subset recursion research demonstrating structure-dependent principles across cross-linguistic contexts, and visual recursion scaffolding learning (Bleotu et al., 2025; Foucault et al., 2025; Lakshmanan et al., 2024).

Funds of Knowledge Framework: We know that families and communities possess rich cultural and intellectual resources formal education often fails to recognize (González, Moll, & Amanti, 2005). Our curriculum explicitly builds on children's cultural knowledge rather than viewing differences as a deficit.

Critical Race Theory and Educational Equity: We recognize opportunity gaps reflect systemic racism in educational structures, not deficits in children or families (Ladson-Billings & Tate, 1995). Our framework examines whose knowledge is valued and how interventions may reproduce or disrupt inequities.

Sociocultural Theory: We view learning as socially mediated, with families and educators supporting development through joint activity (Vygotsky, 1978). Our participatory design recognizes families and educators as experts.

Theory of Change: When children experience playful, culturally responsive recursion instruction, they develop sophisticated cognitive skills typically reserved for privileged students, challenging deficit narratives. When families engage as co-designers, they gain tools to support learning while seeing their cultural knowledge valued. When research demonstrates sophisticated cognitive skills can be enriched equitably anywhere, it challenges assumptions about what young children are "ready" to learn.

Conceptual Model: Recursion serves as a "gatekeeper" cognitive skill unlocking access to advanced mathematical reasoning, computational thinking, linguistic complexity, and systematic problem-solving. Currently disproportionately accessible to privileged children through

enrichment activities, recursion is teachable in any early childhood setting through playful, culturally responsive activities.

4. Description of Proposed Research

A. Central Research Questions

The pilot study aims to answer critical questions regarding the effect of recursion-based curriculum on children:

1. Do brief, playful experiences with recursion support young children's understanding of recursive patterns across linguistic, visual, and categorical domains?
2. Are these experiences equally effective for children from diverse racial, linguistic, and socioeconomic backgrounds?
3. What adaptations ensure educational materials are culturally-responsive and accessible in under-resourced settings?

B. Participants

- **Curriculum Co-Design:** 30 families will be recruited from Head Start of Greater Holyoke (predominantly Puerto Rican, low-income) and Springfield (diverse communities). Through purposive sampling, selected families will be 50% Latino, 20% Black, and 30% dual language learners (Spanish-English). Equal gender representation will be ensured.
- **Pilot Intervention**: 60 children ages 3-5 will be recruited from our partner sites.
- **Educators**: 8 early childhood educators will implement the pilot curriculum.

The University of Massachusetts Amherst IRB will approve all procedures. Materials and consent processes available in English and Spanish.

C. Research Design

This one-year pilot study will employ mixed-methods to develop and test culturally-responsive recursion materials with preschool children (ages 3-5) from predominantly Black, Latino, and low-income communities.

The study will undergo three core phases:

- **Phase 1:** Participatory Curriculum Development (months 1-3)
- **Phase 2:** Pilot Intervention (months 4-9)
- **Phase 3:** Evaluation and Refinement (months 10-12)

I. Phase 1: Participatory Curriculum Development (months 1-3)

We will recruit 30 families from Head Start of Greater Holyoke (predominantly Puerto Rican, low-income) and Springfield (diverse communities). The families will participate in three 2-hour co-design sessions that will assist in adapting the preliminary curriculum materials, with special focus on increasing cultural-responsiveness. Participants will receive $50 per session, as well as access to meals, childcare, and interpretation at our partner sites.

Session 1 - "Story Circle" *(Narrative Recursion):* Families will explore nested story structures, provide cultural adaptations, and share meaningful storytelling traditions (e.g. call-and-response patterns, cyclical narratives).

Session 2 - "Boxes Within Boxes" *(Visual Recursion):* Families will explore nested objects from diverse cultures (e.g. Russian nesting dolls, Chinese nesting boxes), and suggest culturally significant objects for the curriculum.

Session 3 - "Category Detective" *(Classification Recursion):* Families will explore hierarchical classification (e.g. “dogs are pets, pets are animals, animals are living things”) and provide feedback on culturally significant categories and familiar objects.

Data Collection: Researchers will utilize a variety of methods to collect data, including video recordings (with the consent of participants), field notes, and post-session surveys to assess cultural responsiveness, accessibility, and adaptations. Families will complete questionnaires on their language practices at home and cultural background.

Data Analysis: Researchers will conduct a qualitative thematic analysis to identify: (a) cultural adaptations to enhance engagement; (b) barriers to implementation at home; (c) linguistic accessibility concerns; (d) priorities of the family regarding the curriculum. This analysis will inform necessary revisions to the curriculum before implementation of the pilot study.

II. Phase 2: Pilot Intervention (months 4-9)

We will analyze the effects of recursion-based curriculum compared to standard curriculum. Four treatment classrooms (10 students per classroom; 40 total) will receive an 8-week recursion curriculum, with 20-25 assessment sessions twice a week. Two classrooms (10 students per classroom; 20 total) will engage in the standard curriculum. A total of 60 students, ages 3-5, from our partner sites will receive $50 per assessment session.

The 8-week recursion-based curriculum explores the three core activities developed during the co-design sessions of Phase 1. A timeline breaks down the progression of activities:

- **Weeks 1-3: Story Circle**: Students will explore narrative recursion through stories-within-stories, then participate in story-based tasks that assess embedded narratives, adjectives, and possessive structures (adapted from Foucault et al., 2021, 2022).
- **Weeks 4-6: Boxes Within Boxes:** Students will explore visual recursion and pattern recognition through nested physical objects, images, and drawing activities
- **Weeks 7-8: Category Detective:** Students will explore categorical recursion through classification through sorting games that assess hierarchical understanding.

Data Collection: Data will be collected from the following sources to assess the effectiveness of the curriculum, as well as highlight potential areas for improvement.

- **Child Assessments:** Students will participate in a pre-test before engaging in the curriculum (month 4), and a post-test after the curriculum has ended (month 9). Each test session will take approximately 30-40 minutes and be spoken in the child's preferred language.
- **Classroom Observations:** We will conduct weekly hour-long observation sessions to document implementation fidelity, child engagement, cultural responsiveness, and adaptations.
- **Educator Data:** Educators will fill out weekly implementation logs providing observations, as well as engage in monthly 30-minute interviews to explore usability, support needs,

and cultural responsiveness. After the curriculum, educators will attend a post-intervention focus group lasting approximately 90 minutes.

- **Parent Data:** Parents will respond to post-intervention surveys that assess home use, cultural relevance, observed changes, and suggestions. The surveys will take approximately 20 minutes to complete and be available in English or Spanish.

Data Analysis: A combination of quantitative and qualitative data will be used to analyze the results of the study.

Quantitative Analysis: We will utilize mixed-effects models to examine changes in recursion understanding in pre-tests versus post-tests, with the treatment condition (recursion-based versus standard curriculum) as the predictor and the classroom as random effect. Critical equity analyses will include interaction terms testing whether effects differ by variables such as race/ethnicity, home language, and family income.

Qualitative Analysis: We will conduct a thematic analysis of observations, interviews, and surveys identifying: (a) implementation barriers in under-resourced settings; (b) cultural adaptations enhancing effectiveness; (c) educator learning needs; (d) family engagement patterns. Analysis organized around Funds of Knowledge framework, attending to how cultural knowledge was honored.

Integrated Analysis: We will compare quantitative outcomes with qualitative implementation data to understand relationships between implementation quality, cultural responsiveness, and child outcomes.

III. Phase 3: Evaluation and Refinement (Months 10-12)

Feedback Sessions: The results of the pilot study will be shared with family co-designers and educators through two feedback sessions. During these sessions, researchers will present findings and gather input to refine the curriculum. This input is essential to ensure that the analyses reflect perspectives from within the community.

Outputs: Based on feedback from the community, researchers will continue to refine the curriculum materials, as well as create an implementation guide for educators, family guide for home activities, and a research brief. All materials will be designed to be for free online dissemination and low-resource settings. Specifically, the materials will be adaptable to minimal materials, mixed-age groups, and limited training.

Limitations: Due to the size and scope of the pilot study, there will be several limitations to the research. A small sample size limits our ability to generalize across populations. Additionally, the relatively short intervention period may not reveal long-term impacts of the curriculum on students. Despite these limitations, the study will generate crucial proof-of-concept data, as well as culturally-relevant curriculum materials that have been tested and approved for use. The effect size estimates will inform future large-scale randomized controlled trials that examine whether recursion-based learning reduces opportunity gaps and supports transfer to mathematics, computer science, and other reasoning-heavy domains.

D. Project Timeline

Project Start Date: March 1, 2026
Project End Date: March 31, 2027

Phase 1: Participatory Curriculum Development (Months 1-3)

- Month 1 (March): IRB approval, partner site coordination, family recruitment
- Month 2 (April): Co-design Session 1 (Story Circle), preliminary data analysis

- Month 3 (May): Co-design Sessions 2-3 (Boxes Within Boxes, Category Detective), curriculum revision

Phase 2: Pilot Intervention (Months 4-9)

- Month 4 (June): Educator training; Pre-test assessments
- Months 5-7 (June-August): 8-week curriculum implementation with weekly observations, monthly educator interviews
- Month 8-9 (September-October): Post-test assessments, educator focus group, parent surveys

Phase 3: Evaluation and Refinement (Months 10-12)

- Month 10 (October): Data analysis, preliminary findings
- Month 11 (November-December): Community feedback sessions, curriculum refinement
- Month 12 (January-February): Final materials development, research brief, dissemination preparation

Key Milestones:

- Month 3: Community-validated curriculum materials ready for pilot
- Month 9: Pilot intervention complete, all data collected
- Month 12: Refined curriculum materials and research brief complete for public dissemination

4. Description of Project Success

The pilot study will produce data that informs future large-scale research on equitable access to recursion. Further research will support the creation of open-access implementation of this novel curriculum on a larger scale. The success of this project can be measured through quantitative analyses comparing test score data of students in recursion-based curriculum to that of students in standard curriculum, longitudinal studies comparing the two groups, as well as the number of institutions that implement this curriculum in their classrooms. These results would support our hypothesis that exposure to recursion in early childhood better equips students for academic success and professional development, as well as our mission to expand access to recursive learning beyond Western Massachusetts.

5. Available Facilities

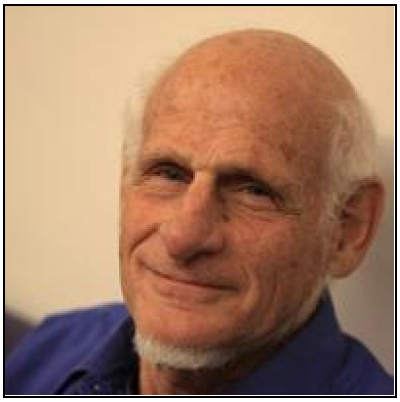
To ensure the success of the proposed work, the Lab requires infrastructure for research operations and space for research participants, both of which have been accounted for, thanks to the University of Massachusetts Amherst and our partner sites.

In terms of facilities for research operations, The Language Acquisition Lab is part of the Linguistics Department at the University of Massachusetts Amherst, located on the fourth floor of the Integrative Learning Center. The Linguistics Department provides the Lab with lab space to host weekly meetings, as well as the equipment and software needed to develop experiments and analyze data. Beyond the Department, the University itself offers administrative help, computing infrastructure, and technology support.

Left: The Integrated Learning Center

Our partner sites, Head Start of Greater Holyoke and Springfield Public Schools Early Learning Centers, will provide the Lab with space research participants. This includes infrastructure for recruitment families during co-design sessions, classroom space for students participating in the 8-week curriculum, and resources and materials for educators.

6. Project Team



Principal Investigator: Tom Roeper, Ph.D. (right) is the founder of the Language Acquisition Lab. He co-developed the Diagnostic Evaluation of Language Variation (DELV) and has conducted seminal research on recursion in child language and a wide range of topics. Roeper provides theoretical guidance, supports curriculum development, and contributes to data interpretation.

Consultation - Research Associate: Deborah Foucault (right) is the Co-Director of the Language Acquisition Lab. She brings expertise in recursion research, language acquisition, instructional coaching, and curriculum development. She has led preliminary pilot testing demonstrating recursion accessibility for young children and has presented and published extensively on the Recursive Set-Subset Ordering (RSSO). Deborah oversees all aspects of the project in collaboration with Roeper and the research team. She leads participatory curriculum development sessions, supervises data collection and analysis, and fosters partnerships with organizations focused on early childhood development.

A Ph.D Graduate Research Assistant (50% time, 12 months) in linguistics will coordinate data collection, conduct classroom observations, assist with qualitative analysis, and support

curriculum material development. The research assistant will receive training in community-engaged research methods and equity-centered evaluation.

Undergraduate Research Assistants (2 positions, 6.67 hours/24 weeks each) from historically excluded communities will conduct child assessments, assist with material preparation, and support family co-design sessions.

Partnership Structure: Deborah established relationships with The Children's Museum at Holyoke through two years of preliminary work and Head Start more recently. Educators will serve as knowledge partners and classroom implementers, contributing expertise on culturally responsive teaching and practical implementation in under-resourced settings. Family co-designers contribute cultural knowledge, ensuring curriculum materials honor diverse traditions and linguistic practices.

Above: The Children's Museum at Holyoke and Head Start have established relationships with the Language Acquisition Lab.

7. Budget

A. Personnel

The Principle Investigator of this project, Tom Roeper, will be paid a PI Summer Salary of $7,000 over the course of 12 months. The Co-PI Consultation across 12 months would be $5,000. The graduate research assistant will be paid $1,500 a month for 12 months, which results in a total of $18,000. The Linguistics Department would assist with waiving the tuition remission and benefits of the graduate research assistant. We will hire two undergraduate research assistants at a rate of $15 an hour. The undergraduate research assistants would work 6.67 hours per week for 24 weeks. This would result in a total of $7,200 to pay the undergraduate research assistants. This amount has been reduced to $4,800 in order to fit the budget. The Lab will pay the remaining amount with its internal funds.

The total amount needed to cover the expenses of personnel is $35,800.

B. Participant Compensation

Participants will receive stipends in recognition of their expertise and to ensure equitable participation.

Families participating in the three co-design sessions will receive $50 for each session. We will recruit 30 families, which results in a total of $4,500. Additionally, The Children's Museum at Holyoke will be paid a co-design session stipend of $333.33 for each of the three sessions,

which amounts to $1,000. Expenses for all three co-design sessions, including space, meals, childcare, and interpretation will be $2,700.

The families of children participating in the curriculum will be paid $50 for the pre- and post-tests, respectively. With a total of 60 families, this amounts to $3,000 for the assessment sessions. Educators will be compensated for their participation in interview sessions at a rate of $50 per session. With 8 educators, this amount will be $400. Finally, parents will receive $15 for completing post-curriculum surveys. 40 parents results in a total of $600 for parent survey completion.

The total amount needed to cover participant compensation is $11,200.

C. Curriculum Development

Curriculum materials emphasize low-cost, accessible items replicable in under-resourced settings. The funds needed to purchase these materials, including diverse cultural nesting objects and drawing supplies, is $800. The budget for acquiring bilingual children's books featuring recursive patterns is $400. The cost of printing curriculum materials is estimated to be $300.

The total needed to cover the expenses of curriculum development is $1,500.

D. Data Collection Materials

Materials needed to collect data, including picture cards, sorting objects, and recording supplies, will cost $800. Video recording equipment will be rented for classroom observation sessions, amounting to $500. Transcription services will be utilized to transcribe educator interviews, and are estimated to cost $200.

The total funds needed to cover the expenses of data collection materials is $1,500.

E. Budget Summary

The total budget for the pilot study, including personnel, compensation for participants, and materials for the curriculum and data collection, amounts to **$50,000**.

8. Summary

This research project addresses educational inequity by investigating recursion, a creative, flexible, and computational cognitive ability that allows us to embed and break down structures within structures. Recursion is a foundational skill necessary for language and complex structures, mathematics, and systematic problem-solving in computational fields. However, explicit exploration of recursion in early childhood education is limited to enrichment activities and programs offered to children from high-income, predominantly white communities. To address this opportunity gap, we propose to offer developmentally appropriate experiences to strengthen this universal cognitive skill that can be explored joyfully in any setting, thereby contributing to educational access and equity.

Bibliography

Anyon, J. (1980). Social class and the hidden curriculum of work. *Journal of Education*, *162*(1), 67-92.

Chomsky, N. (1957). *Syntactic structures*. Mouton.

Dutro, E., & Selland, M. K. (2012). "I like to read, but I know I'm not good at it": Children's perspectives on high-stakes testing in a high-poverty school. *Curriculum Inquiry*, *42*(3), 340-367.

Bleotu, A.C., **Foucault**, **D.**, **Roeper, T.**, and Lakshmanan, U. (2025). The Role of Universal Grammar and Crosslinguistic Influence in the Interpretation of Recursive Set-Subset Adjectives in Adult Romanian L1 English L2 Bilinguals. *Frontiers in Human NeuroScience, Speech in Language Section*. https://doi.org/10.3389/fnhum.2025.1537488

Bleotu, A.C., **Foucault**, **D.,** & **Roeper, T**. 2024. The Bear Wants a Small Green Apple and a Big One: Insights into Anaphoric Reconstruction in Child Romanian. *Proceedings of the Linguistic Society of America* 9 (1): 5734. https://doi.org/10.3765/plsa.v9i1.5734.

Bleotu, A.C., **Foucault, D.**, and **Roeper, T**. 2023. “The Recursive Set- Subset Ordering Principle Orders Adjectives and Relative Clauses in Visual Context”. Proceedings of the Linguistic Society of America 8 (1): 5535. https://doi.org/10.3765/plsa.v8i1.5535.

Bleotu, A.C., **Foucault**, **D.** & **Roeper, T**. 2023. Long short leaves are ‘leaves that are short that are long’. The Recursive Set-Subset Principle orders both adjectives and relative clauses. *Proceedings of the 58th Annual Meeting of the Chicago Linguistic Society*, 13-29.

Foucault, D., Lakshmanan, U., Bleotu, C., **Roeper, T**. (Accepted). Set-Subset Relative Gradable Adjective Recursion Is More Challenging Than Possessive Recursion For Both Monolingual and Bilingual English-Speaking Children. In Adina Camelia Bleotu, **Deborah Foucault**, Tom Roeper (Eds.), *Papers from Recursion Across Languages -The Intricacies of Babel*. New York: Springer. Manuscript Submitted-November 2023; Accepted in 2024.

Foucault, D., Bleotu, A.C., Lakshmanan, U., and Roeper, T. 2024. Recursive adjectives in acquisition. Insights from pedagogical training. Paper presented at the Conference on Theory of Mind and Recursion, University of Bucharest, Bucharest, Romania, March 23-24, 2024.

Foucault, D., Bleotu, A.C., Lakshmanan, U. & Roeper, T. “Development of small big ideas through scaffolding story contexts: Evidence from set-subset recursive adjectives in child English”. Talk presented at 2024 LSA Annual Meeting, January 4-7, 2024.

Foucault, D., Bleotu, A.C., Lakshmanan, U., Merritt, E., Sybing, R., **Roeper, T**. 2022. Relative gradable adjective recursion such as *small small big* mushrooms is more challenging for children than possessive recursion such as the *deer’s friend’s mushrooms*. *Proceedings of the Linguistic Society of America*, [S.I.], v.7, n.1, p. 5294. Available at: https://journals.linguisticsociety.org/proceedings/index.php/PLSA/article/view/5294. https://doi.org/10.3765/plsa.v7i1.5294.

Foucault, D. 2020. A simple logical argument to elucidate the syntax/semantic interface of recursive set/subset. Recursion Workshop, University of Massachusetts, Amherst MA.

González, N., Moll, L. C., & Amanti, C. (2005). **Funds of knowledge: Theorizing practices in households, communities, and classrooms**. Lawrence Erlbaum Associates.

Hauser, M. D., Chomsky, N., & Fitch, W. T. (2002). The faculty of language: What is it, who has it, and how did it evolve? **Science**, **298**(5598), 1569-1579.

Ladson-Billings, G., & Tate, W. F. (1995). Toward a critical race theory of education. **Teachers College Record**, **97**(1), 47-68.

Lakshmanan, U., **Foucault, D**., & **Roeper, T.** (2024). Does branching directionality impact children’s understanding of recursive structures in their stronger language? Evidence from recursive adjectives and possessives. In Merle Weicker, Rabea Lemmer, Andrea Listanti and Angela Grimm (Eds.). *Empirical and theoretical approaches to language acquisition: A generative perspective*. (pp.226-253). Cambridge Scholars Publishing. (Peer-reviewed)

Pérez-Leroux, A. T., Pettibone, E., & Castilla-Earls, A. P. (2017). Down two steps: Are bilinguals delayed in the acquisition of recursively embedded PPs? **Matraga**, **24**, 393-416. https://doi.org/10.12957/matraga.2017.28781

Roeper, T. (2007). *The prism of grammar: How child language illuminates humanism*. The MIT Press.

Roeper, T. (2011). The acquisition of recursion: How formalism articulates the childs path. *Biolinguistics, 5*(1–2), 57–86.