Fırat Soylu

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The University of Alabama, College of Education, Box 870231, Tuscaloosa, AL 35487

CURRENT POSITION

The University of Alabama	2014–
Assistant Professor of Educational Psychology/Neuroscience	present
Director of ELDEN (Embodied Learning Design and Educational Neuroscience) Lab	

EDUCATION

Northwestern University	2011–2014
Postdoctoral Fellow – Center for Connect Learning & Computer Based Modeling & Learning Sciences Program	
Indiana University, Bloomington	2011
PhD (dual major) – Instructional Systems Technology & Cognitive Science	
Indiana University, Bloomington	2009
MSc – Instructional Systems Technology	
Middle East Technical University, Ankara	2003
BSc – Computer Education & Instructional Technology	

RESEARCH INTERESTS

- Educational neuroscience
- Mathematical/numerical cognition
- STEM learning
- Embodied cognition
- Computational modeling
- Learning design
- Human–computer interaction
- Teacher training

PREVIOUS POSITIONS

Northwestern University	2011–2014
Postdoctoral Fellow – Center for Connected Learning and Computer Based Modeling & Learning Sciences Program; PI: Dr. Uri Wilensky)	
Indiana University, Bloomington, IN	2008–2011
Graduate Student – Cognitive Neuroimaging Lab (PI: Dr. Sharlene Newman)	
Indiana University, Bloomington, IN	2010–2011
Teaching / Research Assistant–Learning Sciences Program	
Indiana University, Bloomington, IN	2008–2010
Instructional Consultant – Office of Instructional Consulting	
Indiana University, Bloomington, IN	2004–2008
Associate Instructor – Instructional Systems Technology Department	
Cisco Networking Academy, Bloomington, IN	2007
Instructional Designer	
Middle East Technical University, Ankara, Turkey	2003–2004
Teaching / Research Assistant – Cognitive Science Program	
ODEVA Internet Technologies, Ankara, Turkey	2001–2002
Linux Systems Administrator – Industry	

JOURNAL ARTICLES IN PREPARATION & UNDER REVIEW

Rivera, B. & Soylu, F. (in prep). Semantic Processing in Fraction Comparison: An ERP Study.

Han, H.* & **Soylu, F.***, & Anchan, M. (in revision). Connecting Levels of Analysis in Educational Neuroscience [*first authorship shared]. *Trends in Neuroscience and Education.*

Soylu, F., Gutierrez, A. & Newman, S. (in revision) Effects of Block Play and Board Games on Spatial Skills and Arithmetic Processing in Second Grade Children: an fMRI Study. *Trends in Neuroscience and Education.*

JOURNAL ARTICLES (* with students)

Soylu, F., Rivera, B., Anchan, M., & Shannon, N. (2019). ERP differences in processing canonical and noncanonical finger-numeral configurations. Neuroscience Letters, 705, 74–79. https://doi.org/10.1016/j.neulet.2019.04.032

Soylu, F., Seo, R., Newman, M., & Newman, S. D. (2019). Gray Matter Correlates of Finger Gnosis in Children: A VBM Study. *Neuroscience*, 404, 82–90. https://doi.org/10.1016/j.neuroscience.2019.01.032

Soylu, F., Lester, F., & Newman, S. (2018). You can count on your fingers: The role of fingers in early mathematical development. *Journal of Numerical Cognition*, 4(1), 107–135. https://doi.org/10.5964/jnc.v4i1.85

Han, H., Lee, K., & **Soylu, F.** (2018). Simulating outcomes of interventions using a multipurpose simulation program based on the evolutionary causal matrices and Markov chain. *Knowledge and Information Systems*, 18(2), 223-227. https://doi.org/10.1007/s10115-017-1151-0

Soylu, F., Raymond, D.R., Gutierrez, A.M., & Newman, S.D. (2018). The differential relationship between finger gnosis, and addition and subtraction: an fMRI study. *Journal of Numerical Cognition*, 3(3), 694–715. https://doi.org/10.5964/jnc.v3i3.102

Soylu, F., Holbert, N., Brady, C., & Wilensky, U. (2017). Embodied perspective taking in learning about complex systems. *Journal of Interactive Learning Research.* 28*(3), 269-303. https://www.learntechlib.org/primary/p/174886/*

Han, H., Lee, K., & **Soylu F.** (2016). Predicting long-term outcomes of educational interventions using the evolutionary causal matrices and Markov chain. *Trends in Neuroscience and Education*, 5(4), 157–165. https://doi.org/10.1016/j.tine.2016.11.003

Soylu, F. (2016). An embodied approach to understanding: Making sense of the world through simulated bodily activity. *Frontiers in Psychology*, 7:1914. *https://doi.org/10.3389/fpsyg.2016.01914*

Soylu, F., Newman, S.D. (2016). Anatomically ordered tapping interferes more with one-digit addition than two-digit – A Dual-Task fMRI Study. *Cognitive Processing*. 17(1), 67–77. https://doi.org/10.1007/s10339-015-0737-2

Brady, C., Holbert, N., **Soylu, F.,** Novak, M., & Wilensky, U. (2015). Sandboxes for model-based inquiry. *Journal of Science Education and Technology*, 24(2-3), 265-286. https://doi.org/10.1007/s10956-014-9506-8

Newman, S.D., **Soylu F.** (2014). The impact of finger counting habits on arithmetic in adults and children. *Psychological Research*, *78*(4), 549–56*.* https://doi.org/10.1007/s00426-013-0505-9

Hickey, D.T., **Soylu, F.** (2012). Wikifolios, reflections, and exams for online engagement, understanding, and achievement. *Journal of Teaching and Learning with Technology,*

1(1), 64-71. https://scholarworks.iu.edu/journals/index.php/jotlt/article/view/2045

Yalvac, B., Ayar, M. C., & **Soylu, F**. (2012). Teaching engineering with wikis. *International Journal of Engineering Education, 28*(3), 701.

Yalvac, B., **Soylu, F.,** & Arikan, A., (2011). Embodied cognition and education. *ETHOS: Dialogues in Philosophy and Social Science*, 4(1), 1-20. http://www.ethosfelsefe.com/ethosdiyaloglar/main/?page=read&id=78

Soylu, F. (2009). Academics' views and uses of Wikipedia. *Gnovis Journal*, 9(2). http://www.gnovisjournal.org/2009/05/13/academics-views-and-uses-wikipedia/

Soylu, F. (2009). Designing online learning communities: Lessons from Eksisözlük. *European Journal of Open Distance and E–Learning*, 12(2), 1–10. https://eric.ed.gov/?id=EJ911764

BOOK CHAPTERS

Mutlu, Y. & **Soylu, F.** (2018) Eğitsel sinirbilim ve bedenlenmiş biliş perspektifinden matematik öğrenme güçlüğü yaşayan öğrencilerde parmakla sayma [Finger counting habits of children with mathematics learning difficulty: An educational neuroscience perspective]. *Bilim, Eğitim ve Sanat Araştırmaları – Fen Bilimleri ve Matematik [in Turkish].* Nobel Akademik Yayıncılık, Ankara.

JOURNAL GUEST EDITING

Newman, S. & Soylu, F. (2019). Research topic: Towards an Understanding of the Relationship between Spatial Processing Ability and Numerical and Mathematical Cognition. Frontiers in Psychology. https://www.frontiersin.org/research-topics/7757

PUBLIC DATASETS

Soylu, F. (2019), Public dataset: ERP differences in processing canonical and noncanonical finger-numeral configurations, *Harvard Dataverse*. https://doi.org/10.7910/DVN/BNNSRG

Soylu, F. (2019). Public Dataset – Gray Matter Correlates of Finger Gnosis in Children: a VBM Study, *Harvard Dataverse*. https://doi.org/10.7910/DVN/F5Q24E

Soylu, F. & Newman, S.D (2017), Public Dataset: The Differential Relationship Between Finger Gnosis, and Addition and Subtraction: An fMRI Study, *Harvard Dataverse*. https://doi.org/10.7910/DVN/I7KP3V

CONFERENCE PRESENTATIONS & PROCEEDINGS (*with students)

Soylu, F., Rivera, B.* Anchan, M.*, & Shannon, N.* (2019). *Testing the Motor Simulation Theory in Processing Canonical and Non-Canonical Finger Numeral Configurations*. The 2nd Mathematical Cognition and Learning Society Conference, Ottawa, Canada: June, 2019. (accepted)

Anchan, M.*, Rivera, B.*, Shannon, N.*, & Soylu, F. (2019). *Does It Add Up? Comparing Arithmetic Processing in Bilinguals and Monolinguals*. The 2nd Mathematical Cognition and Learning Society Conference, Ottawa, Canada: June, 2019. (accepted)

Rivera, B.,* & Soylu, F. (2019). *The ERP effects of shared components in fraction comparisons*. The 2nd Mathematical Cognition and Learning Society Conference, Ottawa, Canada: June, 2019. (accepted)

*Anchan, M. & **Soylu F.** (2019). *Does It Add Up? Comparing Arithmetic Processing in Bilinguals and Monolinguals*. 26th Annual Cognitive Neuroscience Society Conference. San Francisco, CA, March 23-26, 2019.

*Anchan, M. & **Soylu, F.** (2018). *Does it Add Up? Comparing Arithmetic Processing in*

Monolinguals and Bilinguals. 59th Annual Meeting of the Psychonomic Society, New Orleans, LA: October, 2018

*Rivera, B., & **Soylu, F**. (2018). *Semantic Processing in Fraction Comparison: An ERP Study.* Poster presentation at the 2018 International Mind, Brain and Education Society Conference. Los Angeles, CA: September, 2018

*Rivera, B., & **Soylu, F**. (2018). *Semantic Processing in Fraction Comparison: An ERP Study.* Paper presentation at the 40th Annual Conference of the Cognitive Science Society. Madison, WI: July, 2018

***Soylu, F.,** Anchan, M., & Newman, S.D. (2018) . *Sex differences in gray matter correlates of finger gnosis in children: a VBM study.* Poster presented at the 2018 Organization for the Study of Sex Differences Conference. Atlanta, GA.

Soylu, F., Raymond, D.R., Gutierrez, A.M., & Newman, S.D. (2018). *The Relation between Finger Sense and Arithmetic: An fMRI Study of Children in Second and Third Grades*. Paper presented at the 2018 AERA (American Educational Research Association) Annual Meeting (SIG - Brain, Neurosciences, and Education). New York, NY: April, 2018

Soylu, F., Gutierrez, A.M., Hanson, M., & Newman, S.D. (2018). *Effects of Structured Block Play on Arithmetic Processing: An fMRI Study*. Paper presented at the 2018 AERA (American Educational Research Association) Annual Meeting (SIG - Brain, Neurosciences, and Education). New York, NY: April, 2018

*Rivera, B., Shannon, N., & **Soylu, F.** (2017). *ERP Markers for Number Gesture Processing*. Poster presented at the The National Diversity in STEM Conference. Salt Lake City, UT: October, 2017

Han, H., Thoma, S. & **Soylu, F.**, Lee, K. (2017). *How to make moral education more effective? From a brain study to policy making.* Paper presented at the 2017 AERA (American Educational Research Association) Annual Meeting.

*Irwin, A., Guyotte, K., **Soylu, F.,** & Houser, Rick. (2016). *Using neuroscience in educational research: A qualitative inquiry of ethics, power, and participation.* Paper presented at the Twelfth International Congress of Qualitative Inquiry. Champaign-Urbana, IL: May, 2016.

Soylu, F. & Yalvac, B. (2016). *Connecting levels of analysis in educational neuroscience.* Paper presented at the 2016 AERA (American Educational Research Association) Annual Meeting (SIG - Brain, Neurosciences, and Education). Washington, DC: April, 2016.

Wagh, A., Novak, M., & **Soylu, F.** (2016). *Integrating agent-based modeling and case studies to learn about population dynamics: A design framework*. Paper presented at the 2016 National Association of Researchers of Science Teaching (NARST) Conference. Baltimore, MD: April, 2016.

Holbert, N., Brady, C., **Soylu, F.**, Novak, M., Wilensky, U. (2015). *The model gallery: supporting idea diffusion in computational modeling activities.* Poster presentation at the 2015 AERA (American Educational Research Association) Annual Meeting (SIG - Advanced Technologies for Learning), Chicago, IL: April, 2015.

Soylu, F., Brady, C., Holbert, N., Wilensky, U. (2014). *The thinking hand: Embodiment of tool use, social cognition and metaphorical thinking and implications for learning design.* Proceedings of the 2014 AERA (American Educational Research Association) Annual Meeting (SIG - Brain, Neurosciences, and Education), Philadelphia, PA: April, 2014

Soylu, F. (2014). Educational Neuroscience of Mathematical Cognition. In Landy, D., Trninic, D., **Soylu, F.**, Kehoe, J., & Fishwick, P., *The implications of embodiment for mathematics and computing education.* Symposium conducted at the 36th Annual Conference of the Cognitive Science Society, Quebec City, Canada: July, 2014.

Soylu, F. & Newman, S. (2012). *Shared use of neural resources between finger tapping and addition*. Poster presented at the Cognitive Neuroscience Society Conference, Chicago, IL: March, 2012

Hickey, D., Bishop S., **Soylu, F.** (2011). *Wikifolios, reflections, and exams for online engagement, understanding, and achievement.* Poster presented at the International Society for the Scholarship of Teaching and Learning (ISSOTL) Conference, Milwaukee, WI: October, 2011

Soylu, F., Newman, S. (2011). *Finger based representation of numbers: correlation between finger tapping ability and digit span*. Abstract for the 33th Annual Conference of the Cognitive Science Society, Boston, MA: July, 2011

Soylu, F. & Newman, S. D. (2011). *Is arithmetic embodied? Differential interference of sequential finger tapping on addition during a dual-task paradigm*. Proceedings of the 33rd Annual Conference of the Cognitive Science Society. Austin, TX: July, 2011.

Soylu, F. (2011). *Mathematical cognition as embodied simulation*. Proceedings of the 33rd Annual Conference of the Cognitive Science Society. Austin, TX: July, 2011.

Soylu, F., Soylu, M. and Davis, H. (2010), *Relating embodiment and phenomenology to art experience*. Paper presented at the National Art Education Association Conference, Baltimore, MD: April, 2010.

Soylu, F., and Millard, M. (2009). *Use of embodied learning approaches in teaching technology.* Paper presented at the Association for Educational Communications and Technology (AECT) meeting, Louisville, KY: October, 2009.

Millard, M., & **Soylu, F.** (2009). An embodied approach for engaged interaction in ubiquitous computing. In J. Jacko (Ed.), *Proceedings of the 13th International Human-Computer Interaction Conference.* (Vol. 5612, pp. 464-472). San Diego, CA: Springer Berlin Heidelberg.

Millard, M., Hallett, K., van Leusen, P. and **Soylu, F**. (2009). *Online student course evaluation systems: Effective strategies and best practices*. Poster presented at the Association for Educational Communications and Technology (AECT) meeting, Louisville, KY: October, 2009.

Soylu, F., and Yalvac, B. (2009). *What does embodied cognition have to offer for science education?* Paper presented at the European Science Education Research Association (ESERA) Conference, Istanbul: August, 2009.

Soylu, F. (2008). *Academics' views on and uses of Wikipedia*. Paper presented at the 10th International Conference on Education, Athens: May, 2008.

Soylu, F. (2008). *Application of design principles of Eksisozluk to online learning communities*. Paper presented at the Harvard GSE Student Research Conference, Cambridge, MA: March, 2008.

INVITED TALKS

Soylu, F. (2019). *Eğitimsel sinirbilim nedir ve neden gereklidir?* Trabzon University online guest lecture. Trabzon, Turkey: May, 2019.
http://uzem.trabzon.edu.tr/index.php/seminerler/

Soylu, F. (2018). *What do educators need to know about neuroscience, brain development, and learning?* The University of Alabama Literacy Leadership Conference, Tuscaloosa, AL: August, 2018

Soylu F. (2018). *Mass Univariate Methods & Machine Learning Classification to Analyze ERP Data*. The 7th Alabama Advanced Imaging Consortium Retreat: July, 2018.

Soylu, F. (2018). *What is Educational Neuroscience & Why Now?* Middle East Technical

University School of Education Visiting Faculty Seminar, Ankara: June, 2018. https://www.youtube.com/watch?v=ALHtb2pwj28

Soylu, F. (2018). *Bodily and evolutionary origins of numerical cognition: Why you can count on your fingers to do math.* Middle East Technical University, Cognitive Science Program Colloquium, Ankara: June, 2018.

Soylu, F. (2018). Bodily and evolutionary origins of numerical cognition: Why you can count on your fingers to do math. University of Alabama – Birmingham, Department of Psychology Colloquium Series, Birmingham: February, 2018.

Soylu, F. (2017). Embodied Cognition, Neuroscience, and Education. Online guest lecture for the MSTU 4133: Cognition and Computers Course. Teacher's College, Columbia University: November, 2017.

Soylu, F. (2017). Bodily origins of numerical cognition: The relation between bodily abilities and numerical skills during development, Clinical Psychology Colloquium, Department of Psychology, The University of Alabama, Tuscaloosa: October, 2017.

Soylu, F. (2017). *The differential relationship between finger sense, and addition and subtraction: an fMRI study.* The 6th Alabama Advanced Imaging Consortium Retreat: July, 2017

Soylu, F. (2017). *Educational Neuroscience: Goals, methods and trends.* The University of Alabama Undergraduate Neuroscience Club, Tuscaloosa: February, 2017.

Soylu, F. (2016). *Bodily origins of numerical cognition: Why you can count on your fingers to do math.* Cognitive Science Colloquium Series, Department of Psychology, Mississippi State University, Starkville: April, 2016.

Soylu, F. (2016). *Bodily and evolutionary origins of numerical cognition.* Mind, Medicine, Brain and Culture meeting, Department of Anthropology, The University of Alabama, Tuscaloosa: February, 2016.

Soylu, F. (2016). *Participation of finger sensorimotor systems in mathematical cognition.* Neuroimaging Club Talk- University of Alabama, Birmingham: February, 2016.

Soylu, F. (2016). *Using Excel pivot charts & tables to make sense of complex data sets.* UA Faculty Resource Center, faculty technology showcase presentation: February, 2016.

Soylu, F. (2015). *Embodied cognition, Neuroscience, and Education.* Online guest lecture for the MSTU 4133: Cognition and Computers Course. Teacher's College, Columbia University: November, 2015.

Soylu, F. (2015). *You can count on your fingers: How and why we use fingers for number processing.* Developmental Contemporary Issues, Psychology Department Weekly Colloquium. The University of Alabama, Tuscaloosa: April, 2015.

Soylu, F. (2014). *Contribution of executive and memory systems to symbolic learning in STEM.* Symposium conducted at the International Mind Brain Education Society (IMBES) Conference, Fort-Wayne, TX: November, 2014

Soylu, F. (2014). *The promises, challenges and future of educational neuroscience.* Keynote address for the College of Education 6th Annual ESPRMC Graduate Symposium. The University of Alabama, Tuscaloosa: March, 2014

TEACHING EXPERIENCE

The University of Alabama – Educational Psychology Program (2014 –)

  BEP 500 - Advanced Educational Psychology (Fall, 2014-2018)
  BEP 541 - Learning and Cognition (Summer, 2019 -)

BEP 570 - Foundations of Educational Neuroscience (Fall, 2014 -)

BEP 670 - Research Methods and Trends in Educational Neuroscience (Spring, 2014 -)

BEP 690 - Computational Methods in Educational Neuroscience (Spring, 2020 -)

Indiana University – IST & Learning Sciences (2004 – 2011)

P540 - Learning and Cognition (Online) – **TA**

P547 - Learning in New Media (Online) – **TA**

P507 - Assessment in Education (Online) – **TA**

R341 - Multimedia in Instructional Technology – **Instructor**

W201 - Beginning Technology Skills – **Instructor**

R521 - Instructional Design and Development (Online) – **TA**

W220 - Technical Issues in Computer–Based Education – **Instructor**

RESEARCH GRANTS

Alabama Life Research Institute (ALRI) Pilot Project Program   2019-2021
(Award #3-7R), PI: Evie Malaia, CO-PI: Firat Soylu, $24,800

"Brain pathways for perception-to-cognition in ASD: Reconciling divergent evidence from computational and emotional behavior"

The University of Alabama Research Grants Committee (RGC), Level 1 Grant   2018-2020
(Award # A19-0199-001), PI: Firat Soylu, $6000

"Mathematical Processing Differences between Bilinguals and Monolinguals"

The University of Alabama Research Grants Committee (RGC), Level 1 Grant   2015-2017
(Award # RGC-2015-49), PI: Firat Soylu, $5950

"The Embodiment of Number Processing: The Relation between Fingers and Numbers"

Research Grants Committee (RGC), Level 3 Grant   2015-2017
PI: Rick Houser, CO-PI: Steve Thoma, Research Scientist: Firat Soylu, $225,000

"The use of mobile EEG and stationary EEG amplifiers in a pilot study focused on the impact of low current brain stimulation on math understanding and calculations"

AWARDS & FELLOWSHIPS

University of Alabama

NIH travel award to attend the UC-Davis ERP Boot Camp   2016

Indiana University, Bloomington

Cognitive Science Summer Research Fellowship   2010

The University Graduate School Doctoral Research Grant   2010

Achasa Beechler Dissertation Award   2010

Graduate Student Organization (GPSO) Research Award   2010

IST A.V. Summer Fellowship	2009
Achasa Beechler Dissertation Proposal Award	2009

Other

Research Council of Norway Foreign Exchange Fellowship	2004
Turkish Education Association Undergraduate Scholarship	2000–02
Turkish Ministry of Education Full Undergraduate Fellowship	1998–02

GRADUATE STUDENTS

PhD Dissertation Chair/Co-Chair

Brian Rivera, UA Educational Psychology Program / Educational Neuroscience PhD Concentration (2016 -).

Nathaniel Shannon, UA Educational Psychology Program / Educational Neuroscience PhD Concentration (2016 -).

Mona Anchan, UA Educational Psychology Program / Educational Neuroscience PhD Concentration (2017 -).

Wesley Webber, UA Counseling and Mental Health Program (2017 -)

Jongjin Kim, UA Educational Psychology Program / Educational Neuroscience PhD Concentration (2018 -).

PhD Dissertation Committee Member

Erin O'Connor, UA Educational Psychology Program, *Adult Literacy Learning: Perceptions and Motivations of Volunteer Tutors,* Committee chair: Stephen Thoma. Graduated in 2018.

Anne-Charlotte Souto, UA Department of Economics, Finance, and Legal Studies, *The Distribution of Returns to Education,* Committee chair: Daniel Henderson. Graduated in 2019.

PhD Dissertation Examiner

Polly K. Lai, The University of Sydney, Faculty of Education and Social Work, *Learning Nanoscience from a Nanoparticle's Perspective: A Computationally Embodied Learning Experience,* Committee chair: Michael Jacobson. Graduated in 2016.

MSc Thesis Committee Member

Jaimie Choi, UA Psychology Department, *Aging Effects in Ambivalence,* Committee Chair: Sheila Black. Graduated in 2019.

PROFESSIONAL SERVICE

Journal Reviewer: American Educational Research Journal, Behavioural Brain Research (2017), Brain Connectivity, Journal of Numerical Cognition, Journal of Learning and Individual Differences, Frontiers in Psychology, Journal of Cognition

Conference Reviewer: International Conference of the Learning Sciences, The National Association for Research in Science Teaching (NARST) Conference, Cognitive Science Society Conference, AERA Conference – Brain Neuroscience Education SIG Review Panel

Grant Proposal Reviewer: US Department of Veteran Affairs, The Rehabilitation Research and Development Services - Spinal Cord Injury/Disorders and Neuropathic Pain Panel (2017, 2018), NSF EHR Cyberlearning Program Review Panel (2016), The Carnegie Trust for the Universities of Scotland (2015)

PROFESSIONAL ACTIVITIES & AFFLIATIONS

Editorial Board, Journal of Numerical Cognition

Alabama Advanced Imaging Consortium, Steering Committee Member (alabamaadvancedimaging.org)

University of Alabama Evolution Working Group, Member (evolution.ua.edu)

AERA (American Educational Research Association)

Cognitive Science Society

IMBES (International Mind Brain and Education Society)

Mathematical Cognition and Learning Society

Psychonomic Society

TECHNICAL SKILLS

Programming / Data Analysis / Modeling: Python, MATLAB, Bash script, SPSS, SPM12, EEGLAB, ERPLAB, Neurobs Presentation (stimulus presentation), Excel, NVivo, NetLogo, Blender