

Sara Guediche, Ph.D.

University of Connecticut
Speech, Language and Hearing Sciences
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Research Interests

My research employs behavioral and functional magnetic resonance neuroimaging (fMRI) methods to study the neural systems that support spoken language processing. I am particularly interested in the mechanisms that enable flexibility and plasticity in mapping sensory input onto meaningful information. My questions are motivated by an interdisciplinary approach that applies neuroscientific principles to the intersection of cognitive science, experimental psychology, and speech, language and hearing research.

Education

2003-2009 **Ph.D., Neuroscience**, *Dissertation Title:* “Adaptive processes in speech perception: contributions from cerebral and cerebellar cortices”

Advisor: Dr. Julie Ann Fiez, Department of Psychology and Neuroscience, Pittsburgh University, Center for Neuroscience, University of Pittsburgh (CNUP), Center for the Neural Basis of Cognition (CNBC), USA.

Co-advisor: Dr. Lori Holt, Department of Psychology, Carnegie Mellon University, Center for Neuroscience, University of Pittsburgh (CNUP), Center for the Neural Basis of Cognition (CNBC), USA

1995-1999 **BS/MS Chemistry** 4-year program, (BS/MS completed 1999, MS award ceremony 2000)

Thesis Title: “Synthesis of deuterio-phospholipids: Applications in MRI contrast”

Advisor: Dr. Dee Ann Casteel

Bucknell University, Lewisburg, PA, USA

1997-1998 Undergraduate Study Abroad Experiences (2 semesters)

Fall Institute for Central American Development Studies (ICADS), Costa Rica.

Spring University of Aberdeen, Aberdeen, Scotland, UK.

Work Experience

Academic Positions

University of Connecticut, Speech, Language and Hearing Sciences

2022-present Postdoctoral Research Associate

Supervisor: Dr. Emily Myers

Basque Center on Cognition, Brain and Language (BCBL)

2019-2021 Marie Skłodowska-Curie Fellow/Postdoctoral Researcher

2016-2019 Postdoctoral Research Fellow

Supervisor: Dr. Arthur G. Samuel

Brown University, Cognitive Linguistic & Psychological Sciences (CLPS)

2013-2016 Assistant Professor (Research)

2009-2013 Postdoctoral Research Associate & Postdoctoral Research Fellow (2010-2011)

Supervisor: Dr. Sheila Blumstein

University of Pittsburgh, Center for Neuroscience and Center for the Neural Basis of Cognition (CNBC)

2007-2008 Graduate Student Fellow (2007-2008)

2006-2007 Graduate Student Teaching Fellow (2006-2007)

2003-2009 Graduate Student (2003-2009)

Note career transition from Chemistry to interdisciplinary research in Cognitive Neuroscience of Language

Industry Position

1999-2003 Pfizer Global Research and Development, Neurosciences
Organic Chemist

Patent "Preparation of 4-phenylpiperidine compounds and their use as modulators of opioid receptors", Stanton F. McHardy, Spiros Liras, **Sara Guediche**, and Jotham Coe; 2005, US2005032837.

Fellowships and Grant Awards

2019-2021 Marie Curie Individual Fellowship
European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 79954
Host institution: Basque Center on Cognition Brain and Language
Mentor: Distinguished Professor, Arthur G. Samuel

2016-2018 Postdoctoral Fellowship
BCBL "Centro de Excelencia" Severo Ochoa postdoctoral research grant
Mentor: Distinguished Professor, Arthur G. Samuel

2010-2011 Fellowship, 2T32MH09118-19 NIH Postdoctoral Training Grant
Training Program in Systems and Behavioral Neuroscience
Department of Cognitive, Linguistic, & Psychological Sciences, Brown University, USA
Mentor: Albert D. Mead Professor, Sheila Blumstein

2009 Graduate and Professional Student Assembly Travel Award, University of Pittsburgh

2007-2008 Andrew Mellon Pre-doctoral Fellowship
Kenneth P. Dietrich School of Arts and Sciences, University of Pittsburgh
Mentor: Julie A. Fiez, Center for Neuroscience, University of Pittsburgh, USA

Publications

† indicates trainee

1. **Guediche, S.**, † Navarra, E, Martin, C. (revision submitted). Noise modulates crosslinguistic effects on L2 auditory word recognition.
2. **Guediche, S.**, † Navarra, E, Caffarra, S., Martin, C. (submitted). Intelligibility of stimuli impacts L1 effects on visual word recognition.
3. **Guediche, S.**, de Bruin, A., Baart, M, & Samuel, AG. (2021). Second-language word recognition in noise: interdependent neuromodulatory effects of semantic context and crosslinguistic interactions driven by word form similarity. *Neuroimage*, 237, 118168.
4. **Guediche, S.**, Fiez, JA. Morse (2021). Comprehension of Morse code predicted by item recall from working memory. *Journal of Speech, Language, and Hearing Research*, 1-11.
5. † Clark, C, **Guediche, S.**, Lallier, M. (2021). Compensatory cross-modal effects of sentence context on visual word recognition in adults. *Reading and Writing*, 1-19.
6. **Guediche, S.**, Baart, M, & Samuel, AG. (2020). Semantic priming effects can be modulated by crosslinguistic interactions during second-language auditory word recognition. *Bilingualism: Language and Cognition*, 1-11.
7. Correia, J. M., Caballero-Gaudes, C., **Guediche, S.**, & Carreiras, M. (2020). Phonatory and articulatory representations of speech production in cortical and subcortical fMRI responses. *Scientific Reports*, 10(1), 1-14.

8. **Guediche, S**, Zhu, Y, Minicucci, D, & Blumstein, SE. (2019). Written sentence context effects on acoustic-phonetic perception: fMRI reveals cross-modal semantic-perceptual interactions. *Brain and language*, 199, 104698.
9. Luthra, S., **Guediche, S.**, Blumstein, SE., & Myers, EB. (2019). Neural substrates of subphonemic variation and lexical competition in spoken word recognition. *Language, Cognition and Neuroscience*, 34(2), 151-169.
10. Luthra, S, Fuhrmeister, P, Molfese, PJ, **Guediche, S.**, Blumstein, SE, & Myers, EB. (2019). Brain behavior relationships in incidental learning of non-native phonetic categories. *Brain and language*, 198, 104692.
11. **Guediche, S.** (2017). Flexible and adaptive processes in speech perception. In A. Lahiri, S. Kotzor (Eds.). *The speech processing lexicon: neurocognitive and behavioural approaches* (pp. 155-186). Berlin, Germany: De Gruyter Mouton.
12. **Guediche S**, Reilly M, Santiago C, Laurent P, & Blumstein SE. (2016). An fMRI study investigating effects of conceptually related sentences on the perception of degraded speech, *Cortex*, 79, 57-74.
13. **Guediche S**, Fiez JA, & Holt LL. (2016). Adaptive plasticity in speech perception: effects of external information and internal predictions, *Journal of Experimental Psychology: Human Perception and Performance*, 42(7), 1048-59.
14. **Guediche S**, Holt LL, Lim S, Laurent P, & Fiez JA. (2015). Evidence for cerebellar contributions to adaptive plasticity in speech perception. *Cerebral Cortex*, 7(25), 1867-77.
15. **Guediche S**, Blumstein SE, Fiez JA, & Holt LL. (2014). Speech under adverse listening conditions: insights from behavioral, computational, and neuroscience research. *Frontiers in Systems Neuroscience*, 7, 126.
16. **Guediche S**, Salvata C, & Blumstein SE. (2013). Temporal cortex reflects effects of sentence context on phonetic processing. *Journal of Cognitive Neuroscience*, 25(5), 706-18.
17. Minicucci D, **Guediche S**, Blumstein SE. (2013). An fMRI examination of the effects of acoustic-phonetic and lexical competition on access to the lexical-semantic network. *Neuropsychologia*, 51(10), 1980-8.
18. **Guediche S**, Ben-Yehudah G, & Fiez JA. (2011). Cerebellum: In: PC Holgan (Ed.). *The Cambridge Encyclopedia of the Language Sciences*. Cambridge University Press.
19. McHardy, SF, Heck, SD, **Guediche, S**, Kalman, M, Allen, MP, Tu, M, ... & Doran, S. (2011). Discovery of CP-866,087, a mu opioid receptor antagonist for the treatment of alcohol abuse and dependence. *Medicinal Chemistry Communications*, 2(10), 1001-1005.
20. Ben-Yehudah G, **Guediche S**, & Fiez JA. (2008). Cerebellar contributions to verbal working memory: beyond cognitive theory. *The Cerebellum*, 6(3), 193-201.

Manuscripts (in preparation)

21. de Bruin, A., **Guediche S.**, Martin, C. Examining voluntary language mixing and switching in bilinguals living in a bilingual society: an fMRI study.
22. † Clark, C, **Guediche, S**, Lallier, M. Reading in the context of immature lexical processing, when do semantics help?
23. Metchenberg, H., Heffner, C., Myers, E.B., **Guediche, S.** Cerebellar role in lexical processing during continuous listening.

Additional Projects (methods and special population)

- Present* Caballero-Gaudes, **Guediche, S.** Comparison of Multi-echo and Single echo functional magnetic resonance results on task-based fMRI: potential benefits of independent component analyses. For denoising in task-based fMRI.
- 2015 Christiana Westlin, Peisi Yan, Daniel P. Dickstein, **Sara Guediche**, Sahil Luthra, Edward G. Walsh, Patrick Bedard, and Michael S. Worden. A practical comparison of two commonly used MRI scanners in neuropsychiatric research: the Siemens TIM Trio and Siemens Prisma fit.
- 2014 Machado N, **Guediche S.**, Blumstein SE. Neural Basis of Sentence Context Effects on Acoustic-phonetic perception in aging population. Collected sample of 9 fMRI participants > 65 years of age
- 2011 **Guediche S**, Stritof J, Mertus J, Kurowski K, Palumbo C, & Blumstein SE. Collected sample of 8 patients with Aphasia on adaptive training paradigm. Behavioral results linked to lesion profile. Results presented, Academy of Aphasia.

Poster Presentations

- Mechtenberg, H. Heffner, C., Myers, E.B., **Guediche, S.** (2022). Cerebellar role in lexical processing during continuous speech perception, Poster presentation at Society for Neurobiology of Language, Philadelphia, PA.
- †Clark, C., **Guediche, S.**, & Lallier, M. (September, 2022). Cross-modal semantic context effects in beginner and advanced readers. Poster presentation at 22nd meeting of the European Society for Cognitive Psychology (ESCoP), Lille, France.
- †Clark, C., **Guediche, S.**, & Lallier, M. (2021). Compensatory cross-modal effects of sentence context on visual word recognition in adults. *Poster presentation, British Dyslexia Association's International Conference, Oxford, UK*, virtual meeting.
- †Navarra, E, Martin, C., **Guediche, S.** (2021). The cognate effect is modulated by auditory noise: implications for L1 co-activation during L2 auditory word recognition, *Poster presentation at Cognitive Neuroscience Society*, virtual meeting.
- Guediche, S**, † Navarra, E, Caffarra, S, Martin, C. (2021). Cognate effects on L2 word recognition are modulated by L1 orthographic neighborhood density, *Poster presentation at Cognitive Neuroscience Society*, virtual meeting.
- †Clark, C., **Guediche, S.**, & Lallier, M. (2021). Compensatory cross-modal effects of sentence context on visual word recognition in adults. *Poster presentation, British Dyslexia Association's International Conference, Oxford, UK*, virtual meeting.
- Guediche, S**, de Bruin, A, Caballero-Gaudes, C., Baart, M., & Samuel. A.G. (2019). Modulation of functional connections from temporal cortex during second language word recognition in noise: does L2 - L1 phonological similarity matter? *Poster presentation, Eleventh Annual Meeting of the Society for the Neurobiology of Language, Helsinki, Finland*
- †Clark, C, **Guediche, S**, & Lallier, M. (2019). Cross-modal effects of sentence context on visual word recognition in adults. *Poster presentation, International Workshop on Reading and Developmental Dyslexia, San Sebastian, Spain.*
- Guediche S**, de Bruin, A., Baart M, & Samuel AG. (2018). L2 word recognition in noise: modulatory effects of semantic and crosslinguistic overlap on brain activity. *Poster presentation, Annual Meeting of the Society for Neuroscience, San Diego, CA.*

- Guediche S**, Baart M, & Samuel AG. (2018). How changes in brain activity are modulated by semantic priming, crosslinguistic phonological overlap, and their interaction, during second language (L2) word recognition in noisy listening conditions, *Poster presentation at Psychonomics*, New Orleans, LA.
- †Clark, C, Lallier, M., **Guediche, S.** (2018). Can an auditory sentence context boost written word intelligibility? *Poster presentation, 1st international workshop on predictive processing, hosted by BCBL*, San Sebastian, Spain, June 20-22.
- †Navarra, E., Caffarra, S., **Guediche, S.**, Martin, C. (2018). Cognate Effect in Noise. *Poster presentation Congreso SEPEX SEPNECA-AIP*, Madrid, Spain.
- †Navarra-Barindelli, E, **Guediche, S**, Caffarra, S, & Martin, CD. (2019). The Cognate Effect in Noise. *Poster presentation, 21st ESCoP conference*, Tenerife, Spain.
- Guediche S**, Baart M, & Samuel AG. (2017). Effects of Semantic Context and Crosslinguistic interactions, on Non-native Word Recognition in Noise. *Poster presentation at Psychonomics*, Vancouver, Canada.
- Luthra S, Fuhrmeister P, Molfese PJ, **Guediche S**, Blumstein SE, & Myers EB. (2017). Brain behavior relationships in implicit learning of non-native phonetic categories, *Society for the Neurobiology of Language*, Montreal, Quebec.
- Luthra S, Fuhrmeister P, **Guediche S**, Blumstein SE, & Myers EB. (2016). Neural correlates of task-irrelevant perceptual learning of non-native speech sounds. *Poster presented, 57th Psychonomic Society Meeting*, Boston MA.
- Guediche S**, Reilly M, Santiago C, Laurent P, & Blumstein SE. (2016). Sentence meaning relationships influence the perception of speech under adverse listening conditions. *Poster presentation, 2nd Workshop on Psycholinguistic Approaches to Speech Recognition in Adverse Conditions*, Nijmegen, Holland.
- Reilly M, **Guediche S**, Blumstein SE. (2013). The neural basis of phonological influence on lexical access. *Poster presentation, Society for the Neurobiology of Language 5th Annual Meeting*, San Diego, CA.
- Guediche S**, Zhu Y, Minicucci D, & Blumstein SE. (2012). A cross-modality investigation of Sentence context effects on speech perception. *Poster presentation, Society for Neuroscience Annual Meeting*, New Orleans, LA.
- Guediche S**, Salvata C, Stritof J, & Blumstein SE. (2010). The influence of sentence context on word categorization: an fMRI investigation. *Poster presentation, Society for the Neurobiology of Language Annual Meeting*, San Diego, CA.
- Guediche S**, Holt L, & Fiez JA. (2009). Examining the neural basis of adaptation in speech perception with and without feedback. *Poster presentation, Society for Neuroscience Annual Meeting*, Chicago, IL.
- Guediche S**, Fiez JA, & Holt LL. (2009). Perceptual learning of distorted speech with and without feedback. *Poster presentation, Cognitive Science Society Annual Meeting*, Amsterdam, Netherlands.
- Guediche S**, Manners J, Khatami M, & Fiez JA. (2008). Using Morse code to understand verbal working memory representations. *Poster presentation, 15th Annual Meeting of the Cognitive Neuroscience Society*, San Francisco, CA.
- Guediche S**, MacGregor L, Wheeler ME, Phillips JS, & Fiez JA. (2007). Investigating the echoic store. *Poster presentation, Society for Neuroscience Annual Meeting*, San Diego, CA.
- Guediche S**, Ben-Yehudah G, & Fiez JA. (2006). Examining the neural basis of the phonological similarity effect in verbal working memory. *Poster presentation, 13th Annual Meeting of the Cognitive Neuroscience Society*, San Francisco, CA.

Guediche S, Chein J, & Fiez JA. (2005). Dissociating between articulatory and phonemic contributions to the phonological similarity effect. *Poster presentation, 12th Annual Meeting of the Cognitive Neuroscience Society*, New York City, NY.

Phillips JS, Laurent PA, **Guediche SA**, Bolger DJ, Qin L, Perfetti CA, & Fiez JA. (2004). Reliable word identification may modulate the response to visually presented words in the left fusiform gyrus. *Poster presentation, Society for Neuroscience Annual Meeting*, San Diego, CA.

Talks, Workshops & Symposium Organization

Guediche, S. (2022). Determinants of language comprehension under challenging conditions. *Invited Talk*, Northeastern University, Boston, MA.

Guediche, S. (2022). Flexibility and plasticity in word recognition under challenging conditions: behavioral and neural effects. *Invited Talk*, Denmark Technical University, Denmark (virtual).

Guediche S. (2021). Semantic context and crosslinguistic effects on second language word recognition, in noise. *Invited Talk*, Plymouth University, United Kingdom (virtual).

Guediche S. (2021). The effects of context and experience on flexibility and plasticity in the perception of spoken Language. *Invited Seminar*, Bilkent University, Turkey (virtual).

Guediche S. (2020). L2 word recognition in noise: modulatory effects of semantic priming and crosslinguistic phono-lexical overlap. *Giraud lab meeting (virtual)*, Department of Fundamental Neurosciences, University of Geneva, Switzerland.

Guediche S, Caffarra S. (2019). European Society for Cognitive Psychology Symposium Organizer. "Auditory comprehension under adverse listening conditions".

Amoruso L, Baart M, Carreiras M, Caffarra S, **Guediche S**, Martin C, Molinaro N, Soto D, Monsalve I. (2017). Scientific committee members for the "Workshop on Predictive Processing", International Workshop hosted by BCBL, San Sebastian,

Guediche S. (2016). The influence of context on the perception of degraded speech: Flexibility and adaptive plasticity. *Invited Talk, Basque Center on Cognition, Brain and Language*, Donostia-San Sebastian, Spain.

Guediche S. (2016). Predictions: When and how do they drive adaptive changes in speech perception? *Invited Talk in the Human Language Processing Lab at Rochester University*, New York, NY.

Guediche S. (2015). Effects of meaning on the perception of degraded speech. *Invited Talk in the Phonotactics Group in the Linguistics Department at Northwestern University*. Chicago, IL.

Guediche S. (2014). Flexible and adaptive processes in speech perception. *Invited Talk, Department of Psychological Sciences, Birkbeck, University of London*. London, United Kingdom.

Guediche S. (2014). Lexical and Semantic predictions: Effects on speech perception and adaptive plasticity. *Invited talk at Workshop on Speech and Lexical Processing*, hosted by University of Oxford, United Kingdom.

Guediche S, Reilly M, Blumstein SE. (2014). Facilitating perception of speech in babble through conceptual relationships. *Talk presented, 167th Acoustical Society of America*, Providence, RI.

Guediche S. (2013). Flexibility and plasticity in speech perception: Effects of context and intelligibility, *Invited talk at Haskins Laboratories*. New Haven, CT.

Guediche S. (2012). Perspectives on language processes and disorders: Foundations for discussion between Cognitive neuroscience and speech pathology. *Invited talk at Bloomsburg University's Annual Brain Awareness Week*, Bloomsburg, PA.

Guediche S, Stritof J, Mertus J, Kurowski K, Palumbo C, & Blumstein SE. (2011). The role of adaptive training on shaping phonetic categorization in Aphasia. *Talk presented, Academy of Aphasia 2011 Annual Meeting*, Montreal, QC, Canada.

Supervision Experience

BCBL PhD Supervisor:

2018- 2022 Eugenia Navarra (with Dr. Martin), Cognitive Neuroscience PhD program
2019- present Catherine Clark (with Dr. Lallier), Cognitive Neuroscience PhD program

BCBL Master's Thesis Supervisor:

2017-2018 Catherine Clark (with Dr. Lallier), Master in Cognitive Neuroscience of Language

Brown University Undergraduate Thesis Co-Mentor:

Natalya Machado (Neuroscience Honors thesis, 2016, Neuroscience Honors Thesis Award)
Carolina Santiago (Neuroscience Research, 2015-2016)
Yuli Zhu (Neuroscience Honors thesis, 2012, Neuroscience Honors Thesis Award)
Jasmina Stritof (Neuroscience Honors thesis, 2011)

University of Pittsburgh Undergraduate Co-Mentor:

Tanisha Hill-Jarrett (Psychology Honors thesis 2009), Maryam Khatami, Jody Manners.
Pittsburgh Science of Learning Center Summer Internship Program: Julia Greene, Andrea Freeman

Teaching Experience

Teaching Staff:

Master in Cognitive Neuroscience of Language. Mental Lexicon (Section II, 2017-2022).
The neuroanatomy of speech and lexical processing, UPV/EHU, University of the Basque Country.

Teaching Fellow:

Brain and Behavior, University of Pittsburgh, (2005), General Chemistry Teaching Assistant, Bucknell University, (1999); Teaching Assistant: Organic Chemistry, Bucknell University, (1998).

Other Professional Activities

Mentorship Training:

Center for the improvement of Mentored Experiment in Research (CIMER), mentorship training program, University of Connecticut (2022)

Editorial Experience:

Guest Editor, Special Issue in *Cortex*. **Guediche, S**, Caffarra S. Mapping sound to meaning under challenging listening conditions: converging findings and open questions across methods.
Review Editor for *Frontiers in Language Sciences*.

Grant Review:

European Research Council (ERC consolidator grant)
2 National Science Foundation proposals
Alzheimer's Society

Committee Member:

BCBL Master's defenses- 10 Master's defense committees
BCBL Mid-term PhD defenses - 6 Ph.D. mid-term defense committees

Guediche S, Caffarra S. (2019). European Society for Cognitive Psychology Symposium Organizer. "Auditory comprehension under adverse listening conditions".
Symposium Speakers: Mattys, S, Bent, T. Bortfeld, H, S., Strauss, A., Zatorre, R.

Ad hoc Reviewer

Neuropsychologia, Brain and Language, Brain and Research, Ammons Scientific, Plos One, JASA-EL, Cerebral Cortex, Cortex, Journal of Speech, Language, and Hearing Research, Frontiers in Psychology, Neuroimage, Frontiers Communication, Brain Sciences, Cognition, Neuroimage, Applied Psycholinguistics, Psychonomic Bulletin Review, Society for the Neurobiology of Language, WIREs Cognitive Science, Chapter in Textbook Neurobiology of Language.

Institutional Activities

Spoken Language Interest Group Organizer (BCBL); Diversity and Inclusion Plan Committee, CLPS Department, Brown University (invited member); Center for the Neural Basis of Cognition Education Committee (peer-elected); Center for the Neural Basis of Cognition Retreat Committee (peer-elected)

Language Proficiency

English (Fluent/Native), **Tunisian Arabic Dialect** (Fluent/Native, *formal Modern Standard Arabic instruction*: ages 6-12 Private Tunisian Education System), **French** (Intermediate/Native exposure, *formal French instruction*: ages 6-12 Private Tunisian Education System), **Spanish** (Intermediate, Aula Azul, San Sebastian Spain), **Basque** (Beginner, AEK Euskaltegi)

Memberships of Scientific Societies

European Society for Cognitive Psychology (2019); Psychonomics Society (2017); Society for the Neurobiology of Language (2010, 2015, 2019); Acoustical Society of America (2014); Society for Neuroscience (2003-2009, 2010, 2012, 2017), Academy of Aphasia (2011); Cognitive Neuroscience Society (2004-2009, 2020); American Chemical Society (2000-2003)

Community Outreach

Pint of Science Talk (2017), Donostia-San Sebastian, Spain; Brain Awareness Week (BAW) Talk (2017), Donostia-San Sebastian, Spain; Neuroscience Day for Biology Classes (2010, 2012-2015, 2017, 2019), Danville High School, Danville, Pennsylvania, USA; Weymouth High School Career Café. (2012), Weymouth, Massachusetts, USA.