

Yael Arbel, Ph.D., CCC-SLP

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EDUCATION

Post-doctoral Research Fellowship, University of South Florida, Department of Psychology, Cognitive Psychophysiology Laboratory - 2006-2009

Cognitive Neuroscience, Mentor: Emanuel Donchin.

Ph.D., University of Texas at Dallas, School of Behavioral and Brain Sciences - 2005

Human Development and Communication Sciences, Minor: *Cognition and Neuroscience*.

M.S., University of Texas at Dallas, School of Behavioral and Brain Sciences - 2002

Communication Sciences and Disorders.

B.A., Tel-Aviv University, School of Medicine, Department of Communication Disorders – 1997

Speech-Language Pathology and Audiology.

POSITIONS AND EMPLOYMENT

- 2015-present Associate Professor, MGH-IHP, Department of *Communication Sciences and Disorders*. Co-director of the *Cognitive Neuroscience Group*
- Fall 2013 – 2015 Clinical Assistant Professor, MGH-IHP, Department of *Communication Sciences and Disorders*
- 2014 – present Affiliate faculty appointment, Northeastern University, Department of *Psychology*
- Fall 2012 – 2013 Visiting Clinical Assistant Professor, Northeastern University, Department of *Speech-Language Pathology and Audiology*
- Fall 2012 – present Affiliate faculty appointment, University of South Florida, Department of *Communication Sciences and Disorders*
- 2010 - present Affiliate Faculty appointment, University of South Florida, Department of Psychology. *Cognitive Neuroscience*.
- 2009 - 2012 Assistant Professor, University of South Florida, Department of *Communication Sciences and Disorders*.
- 2006 - 2009 Postdoctoral Fellow, University of South Florida, Department of Psychology, *Cognitive Psychophysiology Laboratory* (CPL) directed by Dr. Emanuel Donchin.
- 2003 – 2006 Research Assistant - University of South Florida, Department of Psychology, *Cognitive Psychophysiology Laboratory*.
- 2000 – 2002 Research Assistant - University of Texas at Dallas, School of Behavioral and Brain Sciences, *Child Language lab* directed by Dr. Sandy Friel-Patti.

Clinical Experience

- 2013-present Clinical supervision: MGH-Institute of Health Professions
- 2012-2013 Clinical supervision: Visiting Clinical Assistant Professor, Northeastern University
- 2006-2008 Speech Language Pathologist - *Clinical Fellow*, Kid-Pro Therapy Services, Tampa, Florida.
- 2003 Clinical externship, Krockett and Associates, Tampa, Florida.
- 2000 Clinical internship, Callier center, The University of Texas at Dallas.
- 1997-2000 Speech Language Pathologist, Child Developmental Center, Israel.
- 1994-1997 Clinical Internship, Tel-Aviv University, Israel.

Certifications

- Certificate of Clinical Competence (CCC) in Speech Language Pathology
- License in Speech-Language Pathology license, MA

Other Experience and Professional Memberships

2002-present American Speech Language Hearing Association (member)
2003-2013 Society for Psychophysiological Research (member)

Panel member

Graduate Research Fellowship Program (GRFP) – NSF, 2010-2012

Reviewer

Cerebral Cortex

Journal of Experimental Psychology: Learning, Memory, & Cognition

International Journal of Psychophysiology

Transaction on Biomedical Engineering

Journal of Cognitive Neuroscience

Psychophysiology

Journal of Neural Engineering

Social Neuroscience

The Journal of Neuroscience

Journal of Speech-Language and Hearing Research

Frontiers in Neuroprosthetics

Transactions on Neural Systems & Rehabilitation Engineering

Cognitive, Affective, and Behavioral Neuroscience

HONORS

- Braniff Clipped B's Scholarship, awarded by the *Texas Speech-Language-Hearing Foundation* (TSHF) during the annual TSHA convention in Houston.
- New Investigator competitive grant award, awarded by the *American Speech-Hearing-Language Foundation*.
- Invited Participant, *2012 Lessons for Success*, sponsored by the *American Speech-Hearing-Language Association* (ASHA), April, 2012.

PUBLICATIONS

PEER REVIEWED PUBLICATIONS

1. **Arbel, Y.**, McCarty, K. N., Goldman, M., Donchin, E., & Brumback. T. (2018). Developmental changes in the feedback related negativity from 8 to 14 years Article reference. *International Journal of Psychophysiology*. Special issue.
2. **Arbel, Y.**, Hong, L., Baker, T. E., & Holroyd, C. B. (2017). It's all about timing: An electrophysiological examination of feedback-based learning with immediate and delayed feedback. *Neuropsychologia*, *99*, 179-186
3. Chandregowda, A., **Arbel, Y.**, & Donchin, E. (under review). Processing speech errors committed by others: A neurophysiological investigation.
4. **Arbel, Y.**, & Wu, H. (2016). A Neurophysiological examination of quality of learning in a feedback-based learning task. *Neuropsychologia*, *93(A)*, 13-20. <http://dx.doi.org/10.1016/j.neuropsychologia.2016.10.001>
5. **Arbel, Y.**, Murphy, A., & Donchin, E. (2014). On the utility of positive and negative feedback in a paired-associate learning task. *Journal of Cognitive Neuroscience*. *26(7)*, 1445-1453.

6. **Arbel, Y.**, & Donchin, E. (2014). Error and feedback processing by children with Specific Language Impairment—an ERP study. *Biological Psychology*, 99, 83-91.
7. **Arbel, Y.**, Goforth, K., & Donchin, E. (2013). The Good, the Bad, or the Useful? The examination of the relationship between the Feedback Related Negativity (FRN) and long-term learning outcomes. *Journal of Cognitive Neuroscience*, 25(8), 1249-1260.
8. Brumbach, T., **Arbel, Y.**, Goldman, M. S., & Donchin, E. (2012). Developmental changes, across age and gender, in the reaction to the unexpected, indexed by the P300 component during early adolescence. *Psychophysiology*, 49(10), 1330-1339.
9. Li, K., Sankar, R., **Arbel, Y.**, & Donchin, E. (2012). A New Single Trial P300 Classification Method. *International Journal of E-Health and Medical Communications*, 3(4), 31-41.
10. **Arbel, Y.**, & Donchin, E. (2011). When a child Errs: The ERN and the Pe Complex in Children. *Psychophysiology*, 48(1), 55-63. <http://www3.interscience.wiley.com/cgi-bin/fulltext/123478290/PDFSTART>.
11. **Arbel, Y.**, Donchin, E. (2011). How large the sin? A study of the Event Related Potentials elicited by errors of varying magnitude. *Psychophysiology*, 48(12), 1611-1620 <http://onlinelibrary.wiley.com/doi/10.1111/j.1469-8986.2011.01264.x/full>.
12. **Arbel, Y.**, Spencer, K. & Donchin, E. (2011). The N400 and the P300 are not all that independent. *Psychophysiology*, 48(6), 861-875. <http://onlinelibrary.wiley.com/doi/10.1111/j.1469-8986.2010.01151.x/full>
13. Mak, J. N., ***Arbel, Y.**, Minett, J. W., McCane, L. M., Yuksel, B., Ryan, D., Thompson, D., Bianchi, L., & Erdogmus, D. (2011). Optimizing the P300-based BCI: current status, limitations and future directions. *Journal of Neural Engineering*, 8(2), 1-7. (* equal contribution)
14. **Arbel, Y.**, & Donchin, E. (2009). Parsing the Componential Structure of Post Error ERPs: A Principal Component Analysis of ERPs following errors. *Psychophysiology*, 46(6), 1288-1298.

BOOK CHAPTERS

- Sellers, E. W., **Arbel, Y.**, & Donchin, E. (2012). P300 Event-Related Potentials and Related Activity in the EEG. In Wolpaw, J. R. & Wolpaw, E. W. *Brain-Computer Interfaces: Principles and Practice*. Oxford University Press. Oxford, New York.

NON PEER REVIEWED PUBLICATIONS & PRESENTATIONS

1. Hong, L., & **Arbel, Y.** (2016). *Learning & Feedback Timing: Comparing Immediate & Delayed Feedback in Healthy Adults*. 2016 ASHA convention, Philadelphia, PA.
2. Borders, J., & **Arbel, Y.** (2016). Feedback Processing in Paired Associate Declarative Learning of Linguistic and Nonlinguistic Paradigms. The 2016 CNS Annual meeting in New York, NY
3. Chandregowda, A., **Arbel, Y.**, & Donchin, E. (2016). Hand Motor Task: Lateralized readiness potentials and hemispheric asymmetry. Poster presented at the Society for Psychophysiological Research (SPR) 56th annual meeting, Minneapolis, Minnesota. Published abstract. *Psychophysiology*, 53, Issue Supplement S1, S52, Poster 2-61.
4. Chandregowda, A., **Arbel, Y.**, Lucchio, S., Manasterski, C., & Donchin, E. (2015). Detecting errors in others' speech: an ERP investigation. Poster presented at the Society for Psychophysiological Research (SPR) 55th annual meeting, Seattle, Washington. Published abstract. *Psychophysiology*, 52, Issue Supplement S1, S36, Poster 4-90.
5. Lynn, K. S., **Arbel, Y.**, & Barrett, L. F. (2015). Neurophysiological correlates of feedback sensitivity in an emotion perception decision. Annual Conference of the *Social and Affective Neuroscience Society*, 23-25 April 2015, Boston
6. Chandregowda, A., **Arbel, Y.** & Donchin, E. (2014). *Electrophysiological Activity Related to Speech: Seeking Manifestations of Motor Preparation*, the 2014 ASHA convention, Orlando FL.

7. **Arbel, Y.** (2013). Harnessing Brain Signals for Communication. *The American Speech-Language Hearing Association (ASHA) Leader*, January 01, 2013.
8. Chandregowda, A., **Arbel, Y.** & Donchin, E. (2013). Effects of monaural versus binaural stimulus presentation on the Novelty P3. Annual meeting of the *Cognitive Neuroscience Society (CNS)*, 2013.
9. Murphy, A., **Arbel, Y.**, & Donchin, E. (2012). Evaluative feedback vs. informative feedback: what difference does it make? *Psychophysiology*, 49, S1.
10. Chandregowda, A., **Arbel, Y.** & Donchin, E. (2012). When the bizarre is task relevant - An examination of the Novelty P3. *Psychophysiology*, 49, S1.
11. Chandregowda, A., **Arbel, Y.**, & Donchin, E. (2012). Watching an error is not quite the same as committing an error: At least according to the ERN. *Psychophysiology*, 49, S1.
12. Chandregowda, A., **Arbel, Y.**, & Donchin, E. (2012). Is there a benefit to having two ears when evaluating novelty? *Psychophysiology*, 49, S1.
13. Murphy, A. R., **Arbel, Y.**, Brumback, T., & Donchin, E. (2011). The Flankers effect is about curves and angles – not arrows. *Psychophysiology*, 48, S1, S80.
14. Brumback, T., **Arbel, Y.**, Konca, K., Goldman, M. S., & Donchin, E. (2011). Distinguishing developmental differences in P300 elicited by an oddball task. *Psychophysiology*, 48, S1, S80.
15. Goforth, K. L., **Arbel, Y.**, & Donchin, E. (2011). It is (possibly unpleasant but) very useful to know when you err. *Psychophysiology*, 48, S1, S80.
16. Chandregowda, A., **Arbel, Y.**, & Donchin, E. (2011). Odd even though no ball! The fixed stimulus Oddball paradigm. *Psychophysiology*, 48, S1, S80.
17. Clay, S. N., **Arbel, Y.**, & Donchin, E. (2011). What's new? A study of the stability of the Novelty P3. *Psychophysiology*, 48, S1, S79.
18. Brumback, T., **Arbel, Y.**, Diaz, M., Goldman, S. M., & Donchin, E. (2011). Can the feedback ERN distinguish between strong and weak learners? *Psychophysiology*, 48, S1, S79.
19. Li, K., Raju, V. N., Sankar, R., Arbel, Y., & Donchin, E. (2011). Advances and challenges in signal analysis for single trial P300-BCI. In *Foundations of Augmented Cognition. Directing the Future of Adaptive Systems* (pp. 87-94). Springer Berlin Heidelberg.
20. **Arbel, Y.**, De Laurentis, K., Alqasemi, R., Dubey, R., & Donchin, E. (2010). The P300 brain-computer interface as a controller of a wheelchair-mounted robotic-arm system. *Fourth International Brain-Computer Interface Meeting*, Monterey, CA.
21. Goforth, K., **Arbel, Y.**, Clay, S., Paulson, R., & Donchin, E. (2010). How large is your error? An examination of the ERPs elicited by errors of varying degree. *Psychophysiology*, 47, S1, S45.
22. **Arbel, Y.**, & Donchin, E. (2010). The processing of redundant feedback by children –An analysis of the error related ERP components. *Psychophysiology*, 47, S1, S46.
23. Li, K., Sankar, R., **Arbel, Y.**, & Donchin, E. (2009). P300 Based Single Trial Independent Component Analysis on EEG Signal. *Foundations of Augmented Cognition. Neuroergonomics and Operational Neuroscience Lecture Notes in Computer Science*, 2009, 5638/2009, 404-41.
24. Donchin, E., & **Arbel, Y.** (2009). P300 Based Brain Computer Interfaces: A Progress Report. *Foundations of Augmented Cognition. Neuroergonomics and Operational Neuroscience Lecture Notes in Computer Science*, 5638/2009, 724-731.
25. Li, K., Sankar, R., **Arbel, Y.**, & Donchin, E. (2009). P300 Based Single Trial Independent Component Analysis on EEG Signal. *Foundations of Augmented Cognition. Neuroergonomics and Operational Neuroscience Lecture Notes in Computer Science*, 2009, 5638/2009, 404-41.
26. Kamp, S. I., Brumback, T., **Arbel, Y.**, & Donchin, E. (2009). Does Target Letter Position Affect ERP Amplitudes and Classification Accuracy in the P300 Based BCI? Implications of a Principal Component Analysis. *Psychophysiology*, 46, S1.
27. **Arbel, Y.**, & Donchin, E. (2008). Speed accuracy tradeoff of the P300 BCI speller measured in real time. *Psychophysiology*, 45, S1, S107.
28. Brumback, T., **Arbel, Y.**, Goldman, M. S., & Donchin, E. (2008). Using alcohol expectancies to compare ERPs to semantically incongruent & subjectively incongruent sentences. *Psychophysiology*, 45, S1, S62.

29. De Laurentis, K., **Arbel, Y.**, Donchin, E., and Dubey, R. (2008). Implementation of a P300 Brain Computer Interface for the control of a wheelchair mounted robotic arm system. *ASME 2008 Summer Bioengineering Conference*, FL.
30. Brumback, T., **Arbel, Y.**, & Donchin, E. (2008). The effect of feedback type on error-related Event-Related Potential components. *The 2008 Association for Psychological Science (APS) Annual Convention*, Chicago.
31. Palankar, M., **Arbel, Y.**, De Laurentis, K., Alqasemi, R., Dubey, R., & Donchin, E. (2008). Control of a 9-DoF Wheelchair-Mounted Robotic Arm System using a P300 Brain Computer Interface for Activities of Daily Living. Proceedings of the 2008 *IEEE International Conference on Robotics and Biomimetics (ROBIO 2008)*, 348 – 353
32. **Arbel, Y.**, Alqasemi, R., Dubey, R. & Donchin, E. (2007). Adapting the P300-Brain Computer Interface (BCI) for the control of a wheelchair-mounted robotic arm system. *Psychophysiology*, 44, S1, S82-83.
33. **Arbel, Y.** and Donchin, E. (2006). Principal Component Analysis clarifies the component structure of ERPs following errors. Presented at the annual meeting of the SPR (2006). *Psychophysiology*, 43, S1, S20.
34. **Arbel, Y.** and Donchin, E. (2006). Errors do not elicit ERN in children with SLI. Presented at the annual meeting of the SPR (2006). Published abstract. *Psychophysiology*, 43, S1, S21.
35. **Arbel, Y.** (2007). Brain Computer Interface – Transforming electrical brain activity into communication. Invited article. *The ASHA Leader*, 12(12), 14-15.
36. **Arbel, Y.**, Spencer, K. and Donchin, E. (2004). Event related potentials to semantically incongruent and physically deviant words in sentences. Presented at the annual meeting of the Society for Psychophysiological Research (SPR) 2004. Published abstract. *Psychophysiology* 41, S1, S59.

INVITED PRESENTATIONS

- Arbel, Y.**, Del Rossi, G., & Donchin, E. (2012). Football player as Phineas Gage emulator – ERP assessment of executive control after head blows. *American Psychological Association (APA), 2012 Annual Conference*, Orlando, FL.
- Arbel, Y.** (2010). Single trial independent component analysis of the P300 BCI system. *Fourth International Brain-Computer Interface Meeting*, Monterey, CA.
- Arbel, Y.** (2010). The P300 Brain-Computer Interface – An Event Related Potential as a communication channel for the locked-in. Invited lecture as part of the *CSD department seminar (0.1 CEU)*, USF, Tampa, FL.
- Arbel, Y.** & Donchin, E. (2010). Can the Homonculus Beauracticus tolerate blows to the head? Invited talk *CNS brownbag*, USF, Tampa, FL.
- Donchin, E., & **Arbel, Y.** (2009). P300 Based Brain Computer Interfaces: A Progress Report. In *Proceedings of HCI (16)*, 724-731
- Arbel, Y.** (2009). The P300 Brain Computer Interface (BCI) – The Brain as a finger. *IEEE, Engineering in Medicine and Biology Society - Florida West Coast Section*. Tampa, FL.
- Arbel, Y.** (2006). Error processing by children with SLI. Invited talk. Department of Communication Sciences and Disorders, University of South Florida, Tampa, FL.

RESEARCH SUPPORT

National Science Foundation (NSF) Division of Behavioral and Cognitive Sciences A neurophysiological examination of developmental changes and individual differences in feedback processing in children	Arbel(PI)	07/17-06/20
American Speech-Language-Hearing Foundation, 2006 Research Grant Competition for New Investigators. Evaluating the impaired error processing of children with Specific Language Impairment.	Arbel (PI)	11/06-11/07

University of South Florida College of Behavioral & Community Sciences internal grant. The Brain Computer Interface (BCI) as a binary switch	Arbel (PI)	11/09-11/10
MGH Institute of Health Professions 2014 Faculty Research Fellowship A neurophysiological examination of individual differences in the efficiency of feedback processing	Arbel (PI)	7/14-6/15

STUDENTS

Ph.D. Students:

2011-2016	Adithya Chandregowda, Ph.D. student in Communication Sciences and Disorders. Role: Chair of Committee.
2010-present	Fabian Farelo, Ph.D. student in Biomedical Engineering (chaired by Rajiv Dubey). Role: Committee member.
2011- 2013	Siri Kamp, Ph.D. in Cognitive Neuroscience. Department of Psychology, USF. Title: <i>The Psychophysiology of Novelty Processing: Do Brain Responses to Deviance Predict Recall, Recognition, and Response Time?</i> Role: Committee member.
2010 - 2013	Rachel Goff, Ph.D. in Communication Sciences and Disorders, USF. Title: <i>Examining the Effectiveness of Intensive Language Action Treatment on Functional Communication in Individuals with Nonfluent Aphasia.</i> Role: Committee member.
2010 - 2013	Stephanie Karidas, Ph.D. in Communication Sciences and Disorders. Title: <i>Does the use of personally relevant stimuli in semantic complexity training facilitate improved functional communication performance compared to non-relevant stimulus items among adults with chronic Aphasia?</i> Role: Committee member.
2010-2013	Mayur Palankar, Ph.D. in Computer Science, USF. Role: Committee member
2010	Kun Li, Doctoral dissertation in Electrical Engineering (chaired by Ravi Sankar). Role: Committee member.

Graduate Students (thesis):

2014-2016	Lucia Hong, Graduate student, Communication Sciences and Disorders, MGH IHP. Thesis title: <i>comparing immediate versus delayed feedback processing in healthy adults</i>
2014-2016	James Borders, Graduate student, Communication Sciences and Disorders, MGH IHP. Thesis title: <i>a developmental examination of feedback processing during declarative learning</i>

Undergraduate Student (Honors thesis):

2010-2011	Megan Evans, Undergraduate student, Honors College. Role: thesis Director.
2009-2011	Summer Clay, Undergraduate student, Honors College. Role: thesis Director.
2008	Sri Kopuri, Co-chair, Undergraduate Honors thesis. " <i>The Relationship between specific Event-Related Brain Potentials in response to semantic word deviations</i> ".
2008	Gus Halwani. Co-chair, Undergraduate Honors thesis. " <i>Brain Computer Interface</i> ".
2008	Maryam Rostami. Co-chair, Undergraduate Honors thesis. " <i>When Did I Make an Error? A Psychophysiological Analysis of Error Detection</i> ".

TEACHING

SPA 7931: Event Related Potentials
SPA 6805: Research Procedures in Communication Sciences and Disorders
SPA 6401-901: Pediatric Language Disorders
SPA 5552.001: Diagnostic Principles and Practices
SPA 3004: Introduction to Language Development and Disorders
SLPA 6306-11934: Speech-Language Disorders in Children