

Fabian A. Soto
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Academic Employment

2015- Assistant Professor, Florida International University, Department of Psychology.

2013-2015 Postdoctoral researcher, Laboratory for Computational Cognitive Neuroscience, University of California Santa Barbara, Department of Psychological and Brain Sciences.

2011-2013 Sage Junior Research Fellow, University of California Santa Barbara, Department of Psychological and Brain Sciences.

Education

2011 Ph.D. in Psychology , University of Iowa, Department of Psychology.

2006 Psychologist, Universidad de Chile, Department of Psychology.

2005 Licentiate (BS) in Psychology, Universidad de Chile. Graduated with maximum distinction.

2009 Advanced Course in Computational Neuroscience, Freiburg, Germany.

2010 ACCN Internship at Yael Niv's lab in Princeton University, working on Bayesian models of learning and generalization.

Research interests

Visual categorization and object recognition, causal and predictive learning, stimulus generalization, computational cognitive neuroscience.

Honors & Awards

2017 CASE Award for Research, from the College of Arts, Sciences & Education at Florida International University.

2016 Distinguished Scientific Award for Early Career Contribution to Psychology in the area of animal learning and behavior, from the American Psychological Association.

2015 Rising Star in Psychology, from the Association for Psychological Science.

2013 SEAB Basic Dissertation Award in the Experimental Analysis of Behavior, from the Division of Behavior Analysis of the American Psychological Association.

2012	D.C. Priestersbach Dissertation Award in the Social Sciences, from the Graduate College at the University of Iowa.
2012	Brenda A. Milner Award (Young Investigator Award), from the Division of Behavioral Neuroscience and Comparative Psychology of the American Psychological Association.
2011-2013	Sage Junior Research Fellowship, from the Sage Center for the Study of the Mind at the University of California, Santa Barbara.
2011	New Investigator Award, from the Division of Experimental Psychology of the American Psychological Association.
2010	D. Lewis Dissertation Award, from the Psychology Department at the University of Iowa.
2010	Full fellowship for the Advanced Course in Computational Neuroscience Internship Program, supported by the German Federal Ministry for Education and Research and the Gatsby Charitable Foundation.
2009	Graduate College Summer Fellowship, from the University of Iowa.
2009	Full fellowship for the Advanced Course in Computational Neuroscience, supported by the German Federal Ministry for Education and Research and the Gatsby Charitable Foundation.
2008	J. R. Simon Early Scholarship Potential Award, from the Psychology Department at the University of Iowa.
2002-2005	President of the Republic Scholarship, from the Government of Chile.

Research Funding

2018-2019	R21 Grant from NIMH (1R21MH112013-01A1) – <i>Perceptual and decisional processes underlying face perception biases in clinical depression</i> . Role: PI (with Christopher Bevers).
2010	Grant-in-Aid of Research (G20101015155129) from the National Academy of Sciences, administered by Sigma Xi, The Scientific Research Society – <i>General principles of visual object recognition</i> .

Professional Affiliations

2013	Society for Neuroscience
2013	Association for Psychological Science
2010	Sigma Xi, The Scientific Research Society
2010	Vision Sciences Society
2009	Society for Computational Modeling of Associative Learning
2008	Society for the Quantitative Analysis of Behavior
2008	Comparative Cognition Society

Teaching Experience

2015-	Instructor, Florida International University, FL. <i>Introduction to Computational Cognitive Neuroscience</i> <i>Neurobiology of Learning and Memory</i> <i>Cognitive Processes</i>
2013	Invited Lecturer (by Prof. F. G. Ashby), University of California, Santa Barbara, CA. <i>Computational Neuroscience</i>
2012-2013	Co-Lecturer (with Prof. M. Gazzaniga and Sage Junior Fellows), University of California, Santa Barbara, CA <i>Intersections in Mind-Brain Research</i>
2006-2009	Teaching Assistant, University of Iowa, IA. <i>Introduction to Cognitive Psychology (2009).</i> <i>Elementary Psychology (2006, 2008-2009).</i> <i>Psychology of Learning (2008).</i> <i>Research Methods in Psychology (2007).</i> <i>Evaluating Psychological Research (2007).</i>
2008	Instructor, University of Iowa, IA. <i>Elementary Psychology.</i>
2006	Instructor, Universidad de las Américas, Santiago, Chile. <i>Psychology of Learning.</i>
2005-2006	Laboratory Instructor, Universidad de Talca, Talca, Chile. <i>Psychological Processes II.</i>
2006-2006	Instructor, Universidad La Republica, Santiago, Chile. <i>Psychology of Learning.</i>
2002-2005	Teaching Fellow, Universidad de Chile, Santiago, Chile. <i>Statistics.</i> <i>Methodology of Scientific Research.</i>
2003-2004	Teaching Fellow, Universidad La Republica, Santiago, Chile. <i>Psychology of Learning.</i>

Students Supervised

Undergraduate	Veronica Bonilla (University of Iowa Graduate College's Research Opportunities Program, 2009), Jeffrey Y. M. Siow (ICRU Research Fellow, 2010-2011), Sam Handelman (2012-2013), Meghan Lew (2012-2013), Mike Ortiz (2012-2013), Christopher Do (2012-2013), Karim Farrag (2012-2013), Carina Jette (2012-2013), Matt Lyulkin (2012-2013), Scott Mendoza (2012-2013), Maia Moog (2012-2013), Molly O'Grady (2012-2013), Brendan Scolari (2012-2013), Seju Shah (2012-2013), Tomomi Suzuki (2012-2013), Christine Tran (2012-2013), Emily Zheng (2014-2015), Omar Perez (2012-) Sangeeth Jeevan (2015-2016) , Johnny Fonseca (2016), Jefferson Salan (2016-2017), Claudia Wong (2016-), Lily Delgado (2016-), Karla Escobar (2016-), Daniel Rhenals (2017-), Mark Burnard (2017-).
Graduate	Jason Hays (2016-) Sanjay Narasiwodeyar (2016-) Sanaz Hosseini (2017-)

Ad-hoc Reviewer

- Journals: Animal Cognition; Attention, Perception, & Psychophysics ; Behavioural Brain Research; Behavioural Processes; Brain and Cognition; Frontiers in Cognition; Cognitive Psychology; Frontiers in Emotion Science; Frontiers in Human Neuroscience; Frontiers in Quantitative Psychology and Measurement; Journal of Cognitive Neuroscience; Journal of Experimental Child Psychology; Journal of Experimental Psychology: Animal Behavior Processes; Journal of Experimental Psychology: Learning, Memory & Cognition; Journal of Mathematical Psychology; Journal of Vision; Learning and Behavior; Network Neuroscience; NeuroImage; Neuropsychologia; Neuroscience; PLOS Computational Biology, Psychological Bulletin, Psychological Review, Psychological Science; Psychonomic Bulletin & Review.
- Conferences: Cognitive Science Society.
- Grants: National Science Foundation – Reviewer and panelist for the Perception, Action and Cognition program.
Comisión Nacional de Investigación Científica y Tecnológica (CONICYT-Chile).

Editorial and Organizational Service

- 2013 International Editorial Board. *Revista de Psicología de la Universidad de Chile*.
- 2013 Co-organizer. *Sage JRF Workshop - The Human Condition as a Network of Networks: From Genes to Brains to Behavior to Social Groups to Cultures*. April 2013, Santa Barbara, CA.

Software and Electronic Resources

- GRTools v. 0.2.1 (<https://github.com/fsotoc/grtools>): An R package for analysis of perceptual independence using general recognition theory.

Publications

- Soto, F. A. (in press). Contemporary associative learning theory predicts failures to obtain blocking. Comment on Maes et al. (2016). *Journal of Experimental Psychology: General*.
- Perez-Riveros, O., Aitken, M. R. F., Zhukovsky, P., Soto, F. A., Urcelay, G. P., & Dickinson, A. (in press). Human instrumental performance in ratio and interval contingencies: a challenge for associative theory. *Quarterly Journal of Experimental Psychology*.
- Soto, F. A., Zheng, E., Fonseca, J., & Ashby, F. G. (2017). Testing separability and independence of perceptual dimensions with general recognition theory: A tutorial and new R package (grtools). *Frontiers in Psychology*, 8:696.
- Soto, F. A., Bassett, D. S., & Ashby, F. G. (2016). Dissociable changes in functional network topology underlie early category learning and development of automaticity. *NeuroImage*, 141, 220-241.
- Ashby, F. G., & Soto, F. A. (2016). The neural basis of general recognition theory. In J. W. Houpt and L. M. Blaha (Eds.), *Mathematical models of perception and cognition, Volume II: A festschrift for James T. Townsend* (pp. 1-31). Routledge: New York, NY.

- Soto, F. A., & Wasserman, E. A. (2016). Promoting rotational-invariance in object recognition despite experience with only a single view. *Behavioural Processes, 123*, 107-113.
- Soto, F. A., Quintana, G. R., Ponce, F. P., Perez, A. M., Vogel, E. H. (2015). Why are some dimensions integral? Testing two hypotheses through causal learning experiments. *Cognition, 143*, 163-177.
- Soto, F. A., & Ashby, F. G. (2015). Categorization training increases the perceptual separability of novel dimensions. *Cognition, 139*, 105-129.
- Soto, F. A., Musgrave, R., Vucovich, L., & Ashby, F. G. (2015). General recognition theory with individual differences: A new method for examining perceptual and decisional interactions with an application to face perception. *Psychonomic Bulletin & Review, 22(1)*, 88-111.
- Ashby, F. G., & Soto, F. A. (2015). Multidimensional signal detection theory. In J. R. Busemeyer, J. T. Townsend, Z. J. Wang, & A. Eidels (Eds.), *Oxford handbook of computational and mathematical psychology* (pp. 13-34). Oxford University Press: New York, NY.
- Soto, F. A., & Wasserman, E. A. (2014). Mechanisms of object recognition: What we have learned from pigeons. *Frontiers in Neural Circuits, 8*:122.
- Soto, F. A., Gershman, S. J., & Niv, Y. (2014). Explaining compound generalization in associative and causal learning through rational principles of dimensional generalization. *Psychological Review, 121(3)*, 526-558.
- Soto, F. A., Waldschmidt, J. G., Helie, S., & Ashby, F. G. (2013). Brain activity across the development of automatic categorization: A comparison of categorization tasks using multi-voxel pattern analysis. *NeuroImage, 71*, 284-297.
- Soto, F. A., & Wasserman, E. A. (2012). A category-overshadowing effect in pigeons: Support for the Common Elements Model of object categorization learning. *Journal of Experimental Psychology: Animal Behavior Processes, 38(3)*, 322-328.
- Soto, F. A., Siow, J. Y. M., & Wasserman, E. A. (2012). View invariance learning in object recognition by pigeons depends on error-driven associative learning processes. *Vision Research, 62*, 148-161.
- Soto, F. A., & Wasserman, E. A. (2012). Categorical learning in pigeons. In N. Seel (Ed.), *Encyclopedia of the Sciences of Learning* (pp. 512-515). Springer: Boston, MA.
- Soto, F. A., & Wasserman, E. A. (2012). Visual object categorization in birds and primates: Integrating behavioral, neurobiological, and computational evidence within a "general process" framework. *Cognitive, Affective, and Behavioral Neuroscience, 12(1)*, 220-240.
- Soto, F. A., & Wasserman, E. A. (2011). Asymmetrical interactions in the perception of face identity and emotional expression are not unique to the primate visual system. *Journal of Vision, 11(3)*, 1-18.
- Lazareva, O. F., Soto, F. A., & Wasserman, E. A. (2010). Effect of between-category similarity on basic-level superiority in pigeons. *Behavioural Processes, 85(3)*, 236-245.
- Soto, F. A., & Wasserman, E. A. (2010). Missing the forest for the trees: Object discrimination learning blocks categorization learning. *Psychological Science, 21(10)*, 1510-1517.
- Soto, F. A., & Wasserman, E. A. (2010). Comparative vision science: Seeing eye to eye? *Comparative Cognition and Behavior Reviews, 5*, 148-154.
- Soto, F. A., & Wasserman, E. A. (2010). Error-driven learning in visual categorization and object recognition: A common elements model. *Psychological Review, 117(2)*, 349-381.
- Soto, F. A., & Wasserman, E. A. (2010). Integrality/separability of stimulus dimensions and multidimensional generalization in Pigeons. *Journal of Experimental Psychology: Animal Behavior Processes, 36(2)*, 194-205.
- Soto, F. A., Vogel, E. H., Castillo, R. D., & Wagner, A. R. (2009). Generality of the summation effect in human causal learning. *Quarterly Journal of Experimental Psychology, 62(5)*, 877-889.

- Vogel, E., Soto, F. A., Castro, M. E., & Solar, P. (2007). Stimulus specificity in the acquisition and extinction of conditioned taste aversion. *Biological Research*, *40*, 123-129.
- Vogel, E. H., Castro, M. E., Solar, P., & Soto, F. A. (2007). Enhancement of Pavlovian conditioned immunosuppression in rats. *Acta Neurobiologiae Experimentalis*, *67*, 71-81.
- Vogel, E. H., Soto, F. A., Castro, M. E., & Solar, P. (2006). Modelos matemáticos del condicionamiento clásico: Evolución y desafíos actuales [Mathematical models of classical conditioning: Evolution and current challenges]. *Revista Latinoamericana de Psicología*, *38*, 215-243.
- Soto, F. A. (2005). Aprendizaje Asociativo: Modelos Explicativos del Condicionamiento Clásico. Reseña de libro. [Associative Learning: Explanatory Models of Classical Conditioning. Invited Book Review]. *Revista Latinoamericana de Psicología*, *37*, 620-623.
- Soto, F. A., & Saavedra, M. A. (2005). Variabilidad de los efectos de la motivación sobre las estrategias desarrolladas por ratas en el laberinto radial [Variability of food motivation effects on the strategies developed by rats in the radial maze]. *Revista de Psicología de la Universidad de Chile*, *4*, 61-71.

Submitted and in Preparation:

- Soto, F. A., Vukovich, L., & Ashby, F. G. (in revision). Linking signal detection theory and encoding models to reveal independent neural representations from neuroimaging data.
- Perez-Riveros, O., San Martin, R., & Soto, F. A. (submitted). The role of stimulus similarity in the summation effect in human causal learning.
- Soto, F. A., & Ashby, F. G. (in preparation). Novel representations that support rule-based categorization are learned on-the-fly during category learning.
- Soto, F. A. (in preparation). Classification images reveal changes in the encoding of novel face dimensions learned through categorization training.

Presentations in Scientific Meetings

- Soto, F. A. (2017, May). Classification images reveal changes in the encoding of newly learned face dimensions. Poster presented at the 17th Annual Meeting of the Vision Sciences Society, St. Pete Beach, FL.
- Hays, J. S., & Soto, F. A. (2017, May). Modeling the mechanisms of reward learning that bias visual attention. Paper presented at MODVIS 2017: Computational and Mathematical Models in Vision, St. Pete Beach, FL.
- Hays, J. S., & Soto, F. A. (2017, May). Modeling the mechanisms of reward learning that bias visual attention. Poster presented at the 17th Annual Meeting of the Vision Sciences Society, St. Pete Beach, FL.
- Soto, F. A., & Ashby, F. G. (2016, November). Novel representations that support rule-based categorization are acquired on-the-fly during category learning. Poster presented at the 46th Annual Meeting of the Society for Neuroscience, San Diego, CA.
- Soto, F. A., Vucovich, L., & Ashby, F. G. (2016, May). Testing the independence of neural representations of face identity and expression through multidimensional signal detection theory. Poster presented at the 16th Annual Meeting of the Vision Sciences Society, St. Pete Beach, FL.
- Soto, F. A., Vucovich, L., Musgrave, R., & Ashby, F. G. (2013, November). Independent processing of stimulus dimensions: A new signal detection model applied to the perception of face identity and expression. Poster presented at the 43rd Annual Meeting of the Society for Neuroscience, San Diego, CA.

- Soto, F. A., Waldschmidt, J. G., Helie, S., & Ashby, F. G. (2012, October). Multi-voxel pattern analysis of fMRI data reveals changes in category representations accompanying the development of automaticity. Poster presented at the 42nd Annual Meeting of the Society for Neuroscience, New Orleans, LA.
- Soto, F. A., & Wasserman, E. A. (2011, November). View-invariant object recognition is learned by pigeons through reward prediction error. Poster presented at the 52th Annual Meeting of the Psychonomic Society, Seattle, WA.
- Soto, F. A., & Wasserman, E. A. (2011, November). Spatial frequency use in categorizing human faces: Comparing people and pigeons. Paper presented at the Fall Meeting of the Comparative Cognition Society, Seattle, WA.
- Soto, F. A., & Wasserman, E. A. (2011, May). The role of error-driven learning in object categorization by primates and birds. Poster presented at the 11th Annual Meeting of the Vision Sciences Society, Naples, FL.
- Soto, F. A., & Wasserman, E. A. (2010, November). Perception of human face identity and expression by a nonprimate biological vision system. Poster presented at the 51th Annual Meeting of the Psychonomic Society, St. Louis, MO.
- Soto, F. A., & Wasserman, E. A. (2010, November). Pigeons' use of spatial frequency information in the discrimination of identity and emotion of human faces. Paper presented at the Fall Meeting of the Comparative Cognition Society, St. Louis, MO.
- Soto, F. A., & Wasserman, E. A. (2010, March). Interaction between identity and emotional expression in pigeons' perception of human faces. Paper presented at the 17th Annual International Conference on Comparative Cognition, Melbourne, FL.
- Soto, F. A., & Wasserman, E. A. (2009, November). Associative learning in human natural image categorization. Poster presented at the 50th Annual Meeting of the Psychonomic Society, Boston, MA.
- Soto, F. A., & Wasserman, E. A. (2009, November). The relative-validity effect in natural image categorization by pigeons. Paper presented at the Fall Meeting of the Comparative Cognition Society, Boston, MA.
- Soto, F. A., & Wasserman, E. A. (2009, March). A common-elements model of visual category learning in pigeons. Paper presented at the 16th Annual International Conference on Comparative Cognition, Melbourne, FL.
- Wasserman, E. A., & Soto, F. A. (2009, March). Blocking of categorical control by prior individual exemplar learning. Paper presented at the 16th Annual International Conference on Comparative Cognition, Melbourne, FL.
- Soto, F. A., & Wasserman, E. A. (2009, March). Pigeons' discrimination of identity and emotion in photographs of human faces. Poster presented at the 16th Annual International Conference on Comparative Cognition, Melbourne, FL.
- Soto, F. A., & Wasserman, E. A. (2008, November). Competition between stimulus- and category-specific attributes in pigeons' categorization of natural images. Poster presented at the 49th Annual Meeting of the Psychonomic Society, Chicago, IL.
- Soto, F. A., & Wasserman, E. A. (2008, November). Stimulus generalization in two axes of rotation of a three-dimensional object by pigeons. Paper presented at the Fall Meeting of the Comparative Cognition Society, Chicago, IL.
- Lazareva, O. F., Soto, F. A., & Wasserman, E. A. (2008, November). Between-category similarity determines basic-level superiority. Paper presented at the 49th Annual Meeting of the Psychonomic Society, Chicago, IL.
- Soto, F. A., & Wasserman, E. A. (2008, May). Application of an elemental model of associative learning to perceptual categorization in pigeons. Paper presented at the 49th Annual Meeting of the Society for Quantitative Analyses of Behavior, Chicago, IL.

- Castro, L., Soto, F. A., & Wasserman, E. A. (2008, March). Associations between absent events in contingency judgment. Poster presented at the Annual Meeting of the Eastern Psychological Association, Boston, MA.
- Lazareva, O. F., Soto, F. A., & Wasserman, E. A. (2008, March). Basic-level superiority: Effect of between-category similarity. Paper presented at the 15th Annual International Conference on Comparative Cognition, Melbourne, FL.
- Castro, L., Soto, F. A., & Wasserman, E. A. (2007, November). Associations between absent events in contingency judgment. Poster presented at the 48th Annual Meeting of the Psychonomic Society, Long Beach, CA.
- Soto, F. A., Pérez-Acosta, A. M., & Vogel, E. H. (2005, December). Sumatoria de estímulos en el aprendizaje causal humano [Stimulus summation in human causal learning]. Poster presented at IV Jornada de Investigación y Asistencia Técnica y I Jornada Regional de Ciencia y Tecnología, Universidad de Talca, Talca.
- Vogel, E. H., Soto, F. A., Castro, M. E., & Solar, P. A. (2005, December). Especificidad del estímulo en la adquisición y extinción de la respuesta condicionada de aversión al sabor en ratas [Stimulus specificity in the acquisition and extinction of a conditioned taste aversion response in rats]. Poster presented at IV Jornada de Investigación y Asistencia Técnica y I Jornada Regional de Ciencia y Tecnología, Universidad de Talca, Talca.
- Soto, F. A., & Saavedra, M. A. (2004, November). Variabilidad de los efectos del nivel de motivación en ratas sobre el uso de estrategias en el laberinto radial [Variability of motivation level effects over the use of strategies in the radial maze]. Poster presented at VII Jornadas de Etología, Universidad de Concepción, Concepción.
- Soto, F. A., & Hamamé, C. (2002, October). Relevancia de la contingencia entre estímulo discriminativo y una respuesta instrumental con múltiples consecuencias [Relevance of the contingency between discriminative stimulus and an instrumental response with multiple consequences]. Paper presented at VI Jornadas de Etología, Universidad de Chile, Santiago.

Invited Talks

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| 2017 | The Sense of Memory: Integration and Representation of Sensory Processes. SFB 874 / IGSN Conference, Ruhr University, Bochum, Germany. <i>Object categorization and perceptual separability: A two-way street.</i> |
| 2017 | Department of Computer Science, University of Miami. <i>Extending multidimensional signal detection theory to study the independence of brain representations.</i> |
| 2013 | Vision and Image Understanding Lab (Eckstein lab), University of California, Santa Barbara. <i>Independent processing of stimulus dimensions: A new signal detection model and applications to face perception.</i> |
| 2013 | Biopsychology Laboratory (Güntürkun lab), Institute of Cognitive Neuroscience, Ruhr University, Bochum, Germany. <i>Mechanisms of object category learning in birds and primates: A "general process" approach.</i> |
| 2013 | Department of Psychology, University of Iowa. <i>Category learning and dimension learning: Two sides of the same coin?</i> |
| 2011 | Center for Evolutionary Psychology, University of California, Santa Barbara. <i>Object categorization in birds and people: A comparative approach.</i> |
| 2010 | Niv Lab, Princeton University. <i>Error-driven learning in object categorization by pigeons and people.</i> |