

# CURRICULUM VITAE

## Olga F. Lazareva

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### EDUCATION

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- 2001      PhD in Biology\*, Moscow State University and Institute of Higher Nervous Activity, Moscow, Russia. Dissertation: “Transitive inference and object permanence in young and adult birds.”
- 1997      M.S. in Zoology, Kazan State University, Kazan, Russia. Thesis: “Abstract matching-to-sample in hooded crows.”
- 1997      B.A. in History of Culture (with a specialization in philosophy of science), Kazan State University, Kazan, Russia.

### ACADEMIC AND PROFESSIONAL EXPERIENCE

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| 2014-current | Associate Professor   | Drake University  |
| 2008-2014    | Assistant Professor   | Drake University  |
| 2005-2008    | Assistant Research Scientist  | University of Iowa                                      |
| 2003-2008    | Adjunct Assistant Professor   | University of Iowa                                      |
| 2001-2005    | Postdoctoral Research Scholar<br>(Mentor: Dr. E. A. Wasserman)                | University of Iowa                                      |
| 1999-2000    | NATO Visiting Fellow<br>(Mentor: Dr. J. D. Delius)                            | University of Konstanz, Germany                         |
| 1998-2001    | Predocctoral Fellow (Mentors: Drs. Z. A. Zorina, A. Smirnova, V. V. Rayevsky) | Institute of Higher Nervous Activity, Moscow, Russia    |
| 1997-1998    | Predocctoral Fellow<br>(Mentors: Drs. Z. A. Zorina, A. Smirnova)              | Moscow State University, Moscow, Russia                 |
| 1995-1997    | Research Assistant<br>(Mentors: Drs. Z. A. Zorina, A. Smirnova)               | Moscow State University, Moscow, Russia                 |
| 1993-1997    | Research Assistant (Supervisor: Dr. V. Ivliev)                                | Institute of Ecology and Natural Systems, Kazan, Russia |

### AWARDS

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- 2000      Travel grant from European Association of Behavioral Analysis (EABA)
- 2000      Travel grant from the Universities Federation for Animal Welfare (UFAW)
- 1999      NATO Collaborative Linkage Grant “Transitive inference in pigeons” (as a Co-PI)

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\* Because of Pavlov’s influence, the field known as Experimental Psychology in USA is known as Experimental Physiology in Russia; thus, my PhD is in Biology, rather than Psychology.

## RESEARCH INTERESTS

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Comparative cognition, behavioral and neurobiological aspects of early visual processes (e.g., figure-ground segregation and perceptual grouping) in humans and non-human animals, relational learning, mathematical modeling of perceptual and cognitive processes

## PROFESSIONAL ORGANIZATIONS

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Comparative Cognition Society

Member (2001—present), Secretary (2012—present)

Fellow, Psychonomic Society

Member, Society for Neuroscience

## EDITORIAL SERVICE

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Associate Editor

*Behavioural Processes* (2014—present)

Guest reviewer

*Psychological Science, Vision Research, Current Biology, Journal of Experimental Psychology: Animal Behavior Processes, Journal of Comparative Psychology, Animal Cognition, Learning & Behavior, Psychonomic Bulletin & Review, Perception, Attention, and Psychophysics, Journal of Experimental Analysis of Behavior, Journal of Experimental Child Psychology*

## TEACHING

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*Drake University (2008-present)*

**Research Methods**      Research Methods has not been offered as a separate course at Drake University for several years. I have developed the lecture and the laboratory portion of the course together with the lab manual. The course includes a mini-study conducted by a group of students who present their results at the end of the class.

**Comparative Psychology**      Comparative Psychology has not been offered at Drake University previously. This class has a lecture and a laboratory component that includes replication of key experiments in comparative psychology.

**Principles of Behavior**      Although Principles of Behavior have been offered at Drake University before, I have completely redesigned the course. The current course includes a workbook with a series of exercises and a self-modification project conducted by each student during the semester and presented in a poster format at the end of the class.

I have also offered this course in a web-only format during summer, with a detailed analysis of “Harry: Behavioral treatment of self-abuse” video replacing self-modification project component.

**Animal Behavior**      Animal Behavior has not been offered at Drake University previously. This class has a group research project component that involves observing animal behavior in natural environment, analysis of observational data, and presentation in poster format at the end of the class.

Field Methods in Animal Behavior	I have developed a summer travel course that offers an intensive experience in observing and collecting data on animal behavior in the field. The course comprises a field trip to various locales in Midwest including Nebraska, South Dakota, Minnesota, and Iowa.
Introductory Psychology	This course is taught by multiple instructors who follow the same format although have a considerable freedom in a choice of covered topics. My lectures emphasize biological foundations underlying psychological phenomena, and call attention to common misconceptions about psychology and psychological research.
Writing in Psychology	I have developed this J-term course to provide an in-depth instruction on principles of scientific writing. Students learn about key genres of writing within psychology, features of psychological styles and format, and conventions of writing style, and apply this knowledge in a variety of writing assignments.

*University of Iowa (2004-2008)*

Comparative Psychology, Psychology of Learning, Evaluating Psychological Research, Introduction to Brain and Behavior (instructor for all courses)

MENTORING

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Spring 2014	<p><u>Tiffany Williams</u>: began collecting data for a new intermediate-size transposition project.</p> <p><u>Shae Atterberg, Hannah Moses, and Alisa Pasjer</u>: worked on a project exploring the effect of neurotransmitter blockade on figure-ground discrimination in pigeons. Hannah and Shae presented the results of their research at the 11<sup>th</sup> DUCURS conference.</p> <p><u>Philip Martin and David Goodman</u>: developed a MATLAB toolbox for running associative models of transitive inference, and presented their results at the 11<sup>th</sup> DUCURS conference. David also received an Outstanding Junior in Neuroscience award given to junior neuroscience major who has shown exceptional promise for a career in neuroscience or other closely related fields.</p> <p><u>Bailey Mack, Jeffrey Kraft</u>: continued working on SNARC project, and presented the results of their research at the 11<sup>th</sup> DUCURS conference.</p> <p><u>Kayla Salsberg, Kristine Micheletti</u>: continued working on a project concerning development of assessment tools for enrichment program at Blank Park Zoo. Kayla and Kristine presented the results of their research at the 11<sup>th</sup> DUCURS conference. Kristine also received a Research Contribution Special Award given to exceptional cross-disciplinary students (i.e., non-psychology majors) who have made outstanding research contributions in the field of psychology.</p> <p><u>Rebecca Share</u>: completed a capstone project on relative difficulty of speed and motion discrimination in pigeons. Rebecca received an Outstanding Junior in Psychology award given to the junior psychology major who has shown exceptional promise for a career in psychology.</p>
Fall 2013	<p><u>Tiffany Williams</u>: completed a capstone project on implicit relational learning in adult humans and prepared a manuscript for publication in a peer-reviewed journal.</p> <p><u>Hannah Moses and Shae Atterberg</u>: continued working on a project exploring the effect</p>

of neurotransmitter blockade on figure-ground discrimination in pigeons. Hannah and Shae received Psychology Department Student Research Award to cover costs of their project.

Philip Martin: began creating a MATLAB toolbox for running associative models of transitive inference.

Kayla Salsberg, Kristine Micheletti: started working on a project concerning development of assessment tools for enrichment program at Blank Park Zoo.

Bailey Mack, Jeffrey Kraft: started working on SNARC project and prepared IRB application.

Alisa Pasjer: assisted other students with their ongoing projects

Spring 2013

Erin Scully: continued working on analysis of metabolic activity in entopallium and optic tectum. Erin received an Experimental Psychology award, and is currently a PhD student in a neuroscience program at the University of Alberta.

Tiffany Williams: worked on a capstone project on implicit relational learning in adult humans, and presented the results of her project at the annual meeting of Comparative Cognition Society in March 2013 and at the 10<sup>th</sup> DUCURS conference. Tiffany received STAR award from Drake University and TeamCO3 award from Comparative Cognition Society to help with the costs of attending the conference.

Clara Bergene: completed a capstone project on mathematical modeling of the transitive inference in primates, and presented the results of her project at the annual meeting of Comparative Cognition Society in March 2013 and at the 10<sup>th</sup> DUCURS conference. Clara also received STAR award to help with the costs of attending the conference.

Hannah Moses: worked on a project exploring the effect of neurotransmitter blockade on figure-ground discrimination in pigeons. Hannah presented the results of her project at the annual meeting of Comparative Cognition Society in March 2013 and at the 10<sup>th</sup> DUCURS conference.

Tonya Weaver: worked on a project concerning relative speed of learning size discrimination versus speed discrimination. Tonya presented the results of her project at the 10<sup>th</sup> DUCURS conference.

Aldin Osmanovic, Haley Chelsvig: assisted other students with their ongoing projects.

Fall 2012

Erin Scully: completed a capstone project on the effect of neurotransmitter blockade on figure-ground discrimination in pigeons. Erin also prepared a manuscript on her Spring 2012 project concerning the effect of lesion of nucleus subpretectalis on figure-ground discrimination in pigeons. Finally, Erin began analyzing metabolic activity of entopallium and optic tectum associated with different visual tasks in pigeons. Erin presented the results of her lesion project at the annual meeting of Society for Neuroscience and received a STAR award toward the costs of attending the conference. Erin also received a Psychology Department Student Research Award to cover costs of her capstone project.

Tiffany Williams: continued to work on a project concerning implicit relational learning in adult humans.

Nikhil Pillai: completed a capstone project concerning effect of hippocampal lesions on transitive behavior in pigeons.

Kaila Swain: completed a capstone project on the effect of violent videogames on aggressive behavior.

Hannah Moses, Caylin Healey, and Clara Bergene: assisted other students with their ongoing projects.

Summer 2012 Erin Scully: received a DUSCI summer fellowship to conduct a project on the effect of neurotransmitter blockade on figure-ground discrimination in pigeons.

Spring 2012 Kaitlyn Kandray and Nikhil Pillai: worked on a project concerning effect of hippocampal lesions on transitive behavior in pigeons. Kaitlyn completed capstone project using the data collected in a course of the project. Kaitlyn also received a STAR award to present a poster at the annual conference of Comparative Cognition Society in March 2012. Finally, Kaitlyn received a Best Oral Presentation Award for her talk at 9<sup>th</sup> DUCURS conference.

Katie Goodwin and Erin Scully: worked on a project investigating the effect of lesions of nucleus subpretectalis on visual discriminations in pigeons, and presented the results at 9<sup>th</sup> DUCURS conference. Katie completed capstone project using the data collected in a course of a project.

Tiffany Williams and Bailey D'Alessio: worked on a project concerning implicit relational learning in adult humans, and presented the results at 9<sup>th</sup> DUCURS conference.

Kaila Swain: continued collecting data on a project concerning the effect of videogame violence on aggression, and presented preliminary results at 9<sup>th</sup> DUCURS conference. Kaila has also received an Outstanding Junior in Psychology award.

Fall 2011 Kaitlyn Kandray: continued to work on a project concerning effect of hippocampal lesions on transitive behavior in pigeons.

Katie Goodwin: worked on a project investigating the effect of lesions of nucleus subpretectalis on visual discriminations in pigeons.

Odessa Luna: continued working on a project studying implicit relational learning in adult humans.

Kaila Swain: began collecting data on a project concerning effect of videogame violence on aggression.

Tiffany Williams, Nikhil Pillai, and Bailey D'Alessio: assisted in conducting ongoing projects in the lab.

Summer 2011 Kaitlyn Kandray: received a DUSCI summer fellowship to conduct a project on effect of hippocampal lesions on transitive behavior in pigeons

Zach McKinney: assisted in conducting ongoing projects in the lab using pigeons.

Spring 2011 Emily Leiker: completed a capstone project on metabolic activity of nucleus rotundus associated with different visual discriminations in pigeons. Emily has received STAR award to cover the costs of traveling to the meeting of Comparative Cognition Society where she presented the results of another project on relational learning in pigeons. Emily has also received an Experimental Psychology Award.

Kaila Swain and Brandon Lewis: developed a new project on videogame violence. Kaila and Brandon received Department of Psychology Student Research Award to cover the costs of supplies for the project and submitted an IRB proposal.

Odessa Luna: worked on a project on implicit relational learning in adult humans, and presented its results at DUCURS.

Kaitlyn Kandray and Katie Goodwin: assisted in conducting ongoing projects in the lab using pigeons and human participants. Together with Emily, Kaitlyn and Katie presented

- posters on their projects at DUCURS.
- Fall 2010 John McInnerney: completed a capstone project on implicit relational learning in adult humans. John has received STAR award to cover the costs of traveling to the annual meeting of Psychonomic Society where he presented the results of his capstone project.
- Emily Leiker: presented a senior honors thesis on neurobiological foundations of figure-ground segregation in pigeons. Emily has received Department of Psychology Student Research Award to cover cost of supplies for her capstone project.
- Ben Brogger: conducted a project on modeling relational learning in the context of transposition.
- Odessa Luna, Trey Morse, and Zach McKinney: assisted in conducting ongoing projects in the lab using pigeons and human participants.
- Summer 2010 John McInnerney: received a DUSCI summer fellowship to conduct a project on neurobiological foundations of figure-ground segregation in pigeons.
- Emily Leiker: worked on the same project as John McInnerney.
- Jordan Hohl: assisted in conducting research on relational learning and figure-ground segregation in pigeons, and helped to prepare an edited book for submission to the publisher.
- Angela Jansen: assisted in conducting research on relational learning and figure-ground segregation in pigeons.
- Spring 2010 Ben Brogger: began a project on modeling relational learning in a context of transposition.
- John McInnerney: presented a poster on implicit relational learning in adult humans at DUSIS conference in April 2010.
- Gwen Carlson and Emily Leiker: presented the poster on transposition using speed of motion in pigeons at Comparative Cognition conference in March 2010 and at DUSIS conference in April 2010. Both Gwen and Emily received STAR award to cover the costs of traveling to the Comparative Cognition conference.
- Scott Flavin and Ben Brogger: assisted in conducting ongoing projects in the lab using pigeons and human participants.
- Fall 2009 Joyce Yuen: completed a capstone project on implicit relational learning in adult humans. Received Department of Psychology Student Research Award to purchase a computer necessary for conducting her capstone project.
- Reese Petersen: completed a capstone project on a relationship between speed of acquiring categorization and between-category similarity in adult humans.
- Gwen Carlson and Emily Leiker: conducted a project on transposition in pigeons.
- Summer 2009 Jeremy Goh: received a DUSCI summer fellowship to conduct a project on transposition in pigeons.
- Spring 2009 Louise Dihiansan: presented a poster on categorization project at DUCURS conference. Louise is currently enrolled in Master Program in Community Counseling at Argosy University.
- Joyce Yuen and Jeremy Goh: conducted a project on transposition in pigeons.
- Fall 2008 Louise Dihiansan: began a project on a relationship between speed of acquiring categorization and between-category similarity in adult humans.
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## PUBLICATIONS

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# indicates undergraduate student at Drake University

## PEER-REVIEWED

Paxton Gazes, R., Lazareva, O. F., #Bergene, C. N., & Hampton, R. R. (in press). Effects of spatial training on transitive inference performance in humans and rhesus monkeys. *Journal of Experimental Psychology: Animal Learning and Cognition*, ...

#Scully, E., Acerbo, M. J., & Lazareva, O. F. (2014). Bilateral lesion of nucleus subpretectalis/interstitio-pretecto-subpretectalis (SP/IPS) selectively impairs figure-ground discrimination in pigeons. *Visual Neuroscience*, 31, 105-110.

Lazareva, O. F., Young, M. E., & Wasserman, E. A. (2014). A three-component model of relational learning in a transposition paradigm. *Journal of Experimental Psychology: Animal Learning and Cognition*, 40, 63-80. doi:10.1037/xan0000004

Acerbo, M. J., Lazareva, O. F., #McInnerney, J., #Leiker, E., Wasserman, E. A., & Poremba, A. (2012). Figure-ground discrimination in avian brain: Nucleus rotundus and its inhibitory complex. *Vision Research*, 70, 18-26. doi: 10.1016/j.visres.2012.07.023.

Lazareva, O. F. (2012). Relational learning in a context of transposition: A review. *Journal of Experimental Analysis of Behavior*, 97, 231-248. doi: 10/1901.jeab.2012.97-231

Lazareva, O. F., & Wasserman, E. A. (2012). Transitive inference in pigeons: Measuring the associative values of Stimuli B and D. *Behavioural Processes*, 89, 244-255. doi:10.1016/j.beproc.2011.12.001

Lazareva, O.F., Soto, F., & Wasserman, E. A. (2010). Effect of between-category similarity on basic-level superiority in pigeons. *Behavioural Processes*, 85, 236-245. doi: doi:10.1016/j.beproc.2010.06.014

Lazareva, O.F. (2010). On categories, pictures, and the goals of comparative psychology. *Comparative Cognition and Behavior Reviews*, 5, 139-142. doi:10.3819/ccbr.2010.50009

Castro, L., Lazareva, O. F., Vecera, S. P., & Wasserman, E. A. (2010). Changes in area affect figure-ground assignment in pigeons. *Vision Research*, 50, 497-508. doi:10.1016/j.visres.2009.12.016

Lazareva, O. F., & Wasserman, E. A. (2010). Nonverbal transitive inference: Effects of task and awareness on performance. *Behavioural Processes*, 83, 99-112. doi:10.1016/j.beproc.2009.11.002

Lazareva, O. F., & Wasserman, E. A. (2009). Effect of stimulus duration and choice response delay on visual categorization in pigeons. *Learning & Motivation*, 40, 132-146. doi:10.1016/j.lmot.2008.10.003

Lazareva, O. F., Miner, M., Young, M. E., & Wasserman, E. A. (2008). Multiple-pair training increases transposition in pigeons. *Learning & Behavior*, 36, 174-187. doi: 10.3758/LB.36.3.174

Zentall, T., Wasserman, E. A., Lazareva, O. F., Thompson, R., & Ratterman, M. J. (2008). Concept learning in animals. *Comparative Cognition & Behavior Reviews*, 3, 13-45. doi: 10.3819/ccbr.2008.30002

Lazareva, O. F., Wasserman, E. A., & Biederman, I. (2008). Pigeons and humans are more sensitive to

- nonaccidental than to metric changes in visual objects. *Behavioral Processes*, 77, 199-209. doi:10.1016/j.beproc.2007.11.009
- Nagasaka, Y., Lazareva, O. F., & Wasserman, E. A. (2007). Prior experience affects amodal completion in pigeons. *Perception & Psychophysics*, 69, 596-605.
- Gibson, B. M., Lazareva, O. F., Gosselin, F., Schyns, P., & Wasserman, E. A. (2007). Non-accidental properties underlie shape recognition in mammalian and non-mammalian vision. *Current Biology*, 17, 336-340. doi: 10.1016/j.cub.2006.12.025
- Lazareva, O. F., Wasserman, E. A., & Biederman, I. (2007). Pigeons' recognition of partially occluded objects depends on specific training experience. *Perception*, 36, 33-48. doi:10.1068/p5583
- Lazareva, O. F., Castro, L., Vecera, S. P., & Wasserman, E. A. (2006). Figure-ground assignment in pigeons: Evidence for a figural benefit. *Perception & Psychophysics*, 68, 711-724.
- Lazareva, O. F., Freiburger, K. L., & Wasserman, E. A. (2006). Effects of stimulus manipulations on visual categorization in pigeons. *Behavioural Processes*, 72, 224-233. doi:10.1016/j.beproc.2006.03.004
- Lazareva, O. F., & Wasserman, E. A. (2006). Effect of stimulus orderability and reinforcement history on transitive responding in pigeons. *Behavioural Processes*, 72, 161-172. doi:10.1016/j.beproc.2006.01.008
- Lazareva, O. F., Vecera, S. P., & Wasserman, E. A. (2006). Object discrimination in pigeons: Effects of local and global cues. *Vision Research*, 46, 1361-1374. doi:10.1016/j.visres.2005.11.006
- Lazareva, O. F., Wasserman, E. A., Young, M. E. (2005). Transposition in pigeons: Reassessing Spence (1937) with multiple discrimination training. *Learning and Behavior*, 33, 22-46. doi: 10.3758/BF03196048
- Lazareva, O. F., Vecera, S. P., Levin, J. I., & Wasserman, E. A. (2005). Object discrimination by pigeons: Effects of object color and shape. *Behavioural Processes*, 69, 17-31. doi:10.1016/j.beproc.2005.01.007
- Lazareva, O. F., Freiburger, K. L., & Wasserman, E. A. (2004). Pigeons concurrently categorize photographs at both basic and superordinate levels. *Psychonomic Bulletin and Review*, 11, 1111-1117. doi: 10.3758/BF03196745.
- Lazareva, O. F., Bagozkaja, M. S., Smirnova, A. A., Zorina, Z. A., Rayevsky V. V., & Wasserman, E. A. (2004). Transitive responding in hooded crows requires linearly-ordered stimuli. *Journal of the Experimental Analysis of Behavior*, 82, 1-19. doi: 10.1901/jeab.2004.82-1.
- Zorina, Z. A., Smirnova, A. A., Lazareva, O. F., and Mandriko, E. V. (2002). Reasoning in animals as a predecessor of human cognition. *Psychology and Applications*, 9 (2), 56-57. (in Russian)
- Smirnova, A. A., Lazareva, O. F., and Zorina, Z. A. (2002). Prototype symbolization in hooded crows. *Zhurnal Vyshei Nervnoi Dejatelnosti*, 52 (2), 241-254. (in Russian)
- Lazareva, O. F., Smirnova, A. A., Zorina, Z. A., & Rayevsky V. V. (2001). Hooded crows solve a transitive inference problem cognitively. *Animal Welfare*, 10 (Suppl.), 219-231.



Smirnova, A. A., Lazareva, O. F., & Zorina, Z. A. (2000). Use of number in crows: investigation by matching and oddity learning. *Journal of the Experimental Analysis of Behaviour*, 73, 163-176.

Lazareva, O. F., Smirnova, A. A., Rayevsky, V. V., & Zorina, Z. A. (2000). Transitive inference formation in hooded crows: preliminary data. *Reports of Russian Academy of Sciences*, 35, 163-166. (in Russian)

Smirnova, A. A., Lazareva, O. F., & Zorina, Z. A. (1998). Matching and oddity learning in hooded crows (*Corvus cornix L.*): same/different concept formation. *Zhurnal Vyshei Nervnoi Dejatelnosti*, 48 (5), 855-867. (in Russian)

#### BOOKS AND BOOK CHAPTERS

Lazareva, O. F., Shimizu, T., & Wasserman, E. A. (2012). *How animals see the world: Comparative biology, behavior, and evolution of vision*. New York: Oxford University Press. (edited book containing 27 chapters on vision in primates, birds, spiders, honeybees, and fish).

Lazareva, O.F., & Wasserman, E.A. (2012). Figure-ground assignment and object-based attention in birds. In O. F. Lazareva, T. Shimizu, & E. A. Wasserman (Eds.), *How animals see the world: Comparative biology, behavior, and evolution of vision*, p. 63-76. New York: Oxford University Press.

Lazareva, O. F. Transitive inference in non-human animals. (2012). In E. Wasserman, & T. Zentall (Eds.), *Handbook of Comparative Cognition*, p. 718-735. New York: Oxford University Press.

Lazareva, O. F., & Wasserman, E. A. (2010). Category learning and concept learning in birds. In D. Mareshal, P. Quinn, & S. Lea (Eds.), *The making of human concepts*, p. 151-172. New York: Oxford University Press.

Lazareva, O. F., & Wasserman, E. A. (2008). Categories and concepts in animals. *Learning Theory and Behavior. Vol. [1] of Learning and Memory: A Comprehensive Reference*, 4 vols. (J.Byrne Editor), pp. 197-226. Oxford: Elsevier.

Lazareva, O. F., Levin, J. I., Vecera, S. P., & Wasserman, E. A. (2006). The search for object-based attention in pigeons: Failure and success. In K. Fujita & S. Itakura (Eds.), *Diversity of Cognition*. Kyoto: Kyoto University Academic Press, pp. 3-37.

#### IN REVIEW

#Goodman, D., & Lazareva, O. F. (submitted). TrI Toolbox: Reinforcement-based models of transitive inference in MATLAB.

Lazareva, O. F., #Kandray, K. K., & Acerbo, M. J. (submitted). Hippocampal lesion and transitive inference: Dissociation of inference-based and reinforcement-based strategies in pigeons.

#### IN PREPARATION

#Bergene, C., Paxton Gazes, R., Hampton, R. R., & Lazareva, O. F. (in preparation). An application of reinforcement-based models of transitive inference to primate data.

Lazareva, O. F., & #Share, R. (in preparation). Pigeons and people are less sensitive to differences in speed of motion than to differences in size.

#Williams, T., #McInnerney, J., & Lazareva, O. F. (in preparation). Implicit relational learning in a multiple-object tracking task.

Lazareva, O. F., Vecera, S., & Wasserman, E. A. (in preparation). Object discrimination in pigeons in a two-alternative choice task.

Schneider, J., & Lazareva, O. F. (in preparation). A comparison of explicit instruction and guided inquiry methods for teaching null hypothesis testing and p-value interpretation.

Lazareva, O. F., Nagasaka, Y., & Wasserman, E. A. (in preparation). Reassignment test and category learning: Effect of the number of stimuli.

Lazareva, O. F., Castro, L., Vecera, S. & Wasserman, E. A. (in preparation). Bottom-up cues influence figure-ground assignment in humans.

#### INVITED TALKS

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Lazareva, O. F., #Bergene, C. N., Paxton Gazes, C., & Hampton, R. (2014, February). *Nonverbal transitive inference: The case for space*. Invited talk presented at the annual meeting of Southern Society for Philosophy and Psychology, Charleston, SC.

Lazareva, O. F., Wasserman, E. A., Young, M. E. (2013, October). *The three-component model of relational behavior in a transposition task*. Invited talk presented at the annual meeting of Mid-American Association for Behavior Analysis, Milwaukee, Wisconsin.

Lazareva, O. F. (2013, July). *Logic or reinforcement history? Transitive inference in nonverbal settings*. Invited talk presented at the Psychology Department of Emory University, GA.

Lazareva, O.F. (2011, September). *Of pigeons and people: Relational learning in a transposition task*. Invited talk presented at the Psychology Department of the University of Iowa, IA.

#### CONFERENCE PRESENTATIONS

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Acerbo, M. J., & Lazareva, O. F. (2014, March). *Neurobiological bases of figure-ground segregation in pigeons*. Poster presented at the annual meeting of Cold Harbor Spring Laboratory *Avian Model Systems*, New York, NY.

Lazareva, O. F. (2014, March). *Pigeons are less sensitive to differences in speed of motion than to differences in size*. Paper presented at the meeting of Comparative Cognition Society, Melbourne, FL.

Acerbo, M. J., #Kandray, K., Lazareva, O.F. (2013, March). *Bilateral hippocampal lesion impairs transitive responding in pigeons*. Paper presented at the meeting of Comparative Cognition Society, Melbourne, FL.

Lazareva, O. F., Paxton Gazes, R., & Hampton, R. R. (2013, March). *Does spatial arrangement of the training stimuli enhance nonverbal transitive inference?* Paper presented at the meeting of Comparative Cognition Society, Melbourne, FL.

- #Bergene, C., Paxton Gazes, R., Hampton, R. R., & Lazareva, O. F. (2013, March). *Using reinforcement-based models of transitive inference to simulate primate data*. Poster presented at the meeting of Comparative Cognition Society, Melbourne, FL.
- #Moses, H. E., #Scully, E. N., Acerbo, M.J., & Lazareva, O. F. (2013, March). *Effect of pharmacological manipulation of nucleus subpretectalis on figure-ground discrimination in pigeons*. Poster presented at the meeting of Comparative Cognition Society, Melbourne, FL.
- #Williams, T., & Lazareva, O. F. (2013, March). *Implicit relational learning in multiple-object tracking task: Do people really track the objects?* Poster presented at the meeting of Comparative Cognition Society, Melbourne, FL.
- Lazareva, O. F., #Kandray, K., Paxton, R., & Hampton, R. R. (2012, October). *Do reinforcement-based models of transitive inference accurately describe primate data?* Paper presented at the satellite meeting of Comparative Cognition Society at Society for Neuroscience, New Orleans, LA.
- Acerbo, M. J., Lazareva, O. F., #McInnerney, J., #Leiker, E., Poremba, A., & Wasserman, E. A. (2012, October). *Metabolic activity of nucleus rotundus and its inhibitory complex associated with figure-ground discrimination*. Paper presented at the satellite meeting of Comparative Cognition Society at Society for Neuroscience, New Orleans, LA.
- Lazareva, O. F., #Kandray, K., #Pillai, N., & Acerbo, M.J. (2012, October). *Nonverbal transitive inference in pigeons: Effect of bilateral lesion of hippocampus*. Poster presented at the annual meeting of Society for Neuroscience, New Orleans, LA.
- Acerbo, M. J., Lazareva, O. F., #Scully, E., & #Goodwin, K. (2012, October). *Bilateral lesion of nucleus subpretectalis/interstitio-pretecto-subpretectalis (SP/IPS) selectively impairs figure-ground discrimination in pigeons*. Poster presented at the annual meeting of Society for Neuroscience, New Orleans, LA.
- #Kandray, K., Acerbo, M. J., & Lazareva, O. F. (2012, March). *Effect of bilateral hippocampal lesion on transitive inference task in pigeons*. Poster presented at the meeting of Comparative Cognition Society, Melbourne, FL.
- Acerbo, M. J., & Lazareva, O. F. (2012, March). *Effect of lesion of nucleus subpretectalis on visual discrimination in pigeons*. Paper presented at the meeting of Comparative Cognition Society, Melbourne, FL.
- Lazareva, O.F., #Kandray, K., & #Leiker, E. (2012, March). *Effect of generalization gradients, relational disparity, and familiarity in motion-based transposition*. Paper presented at the meeting of Comparative Cognition Society, Melbourne, FL.
- Lazareva, O. F., Young, M. E., & Wasserman, E. A. (2011, March). *Modeling relational learning in transposition: Joint effects of generalization gradients, relational disparity, and novelty*. Paper presented at the meeting of Comparative Cognition Society, Melbourne, FL.
- #Leiker, E., & Lazareva, O. F. (2011, March). *Transposition task based on speed of motion*. Paper presented at the meeting of Comparative Cognition Society, Melbourne, FL.

- Acerbo, M. J., #McInnerney, J., Lazareva, O. F., Poremba, A., & Wasserman, E. A. (2011, March). *The role of nucleus rotundus in figure-ground, color, and shape discrimination*. Paper presented at the meeting of Comparative Cognition Society, Melbourne, FL.
- Lazareva, O. F., #McInnerney, J., & #Yuen, J. (2010, November). *Implicit relational learning in a multiple-object tracking task*. Paper presented at the meeting of Psychonomic Society, Boston, MA.
- #McInnerney, J., Lazareva, O. F., & #Yuen, J. (2010, November). *An application of multiple-object tracking task to study implicit relational learning in adult humans*. Paper presented at the satellite meeting of Comparative Cognition Society, Saint Louis, MO.
- Lazareva, O. F., #Goh, J., & #Yuen, J. (2010, March). *Effect of position of discriminative stimuli on discrimination learning in pigeons*. Paper presented at the meeting of Comparative Cognition Society, Melbourne, FL.
- #Carlson, G., #Leiker, E., & Lazareva, O. F. (2010, March). *Multiple-pair transposition based on relative speed of rotation*. Poster presented at the meeting of Comparative Cognition Society, Melbourne, FL.
- Lazareva, O. F. (2009, November). *Categorization and perception of similarity in pigeons*. Paper presented at the meeting of Psychonomic Society, Boston, MA.
- Lazareva, O. F. (2009, May). *Category learning in pigeons: The role of perceptual similarity*. Invited talk presented at the annual meeting of Midwestern Psychological Association, Chicago, IL.
- Lazareva, O. F., & Wasserman, E. A. (2009, March). *Transitive inference in pigeons: Measuring the associative values of B and D*. Paper presented at the meeting of Comparative Cognition Society, Melbourne, FL.
- Lazareva, O. F., & Wasserman, E. A. (2008, November). *Nonverbal transitive inference: Effects of task and awareness on performance*. Paper presented at the satellite meeting of Comparative Cognition Society, Chicago, IL.
- Lazareva, O. F., Soto, F., & Wasserman, E. A. (2008, November). *Between-category similarity determines basic-level superiority*. Paper presented at the meeting of Psychonomic Society, Chicago, IL.
- Lazareva, O. F., Soto, F., & Wasserman, E. A. (2008, March). *Basic-level superiority: Effect of between-category similarity*. Paper presented at the meeting of Comparative Cognition Society, Melbourne, FL.
- Acerbo, M. J., Lazareva, O. F., Poremba, A., & Wasserman, E. A. (2008, March). *Metabolic mapping of figure-ground segregation in pigeons: Subregions of the nucleus rotundus*. Paper presented at the meeting of Comparative Cognition Society, Melbourne, FL.
- Lazareva, O. F., Acerbo, M. J., Poremba, A., & Wasserman, E. A. (2007, November). *Metabolic mapping of figure-ground segregation in pigeons: Subregions of the nucleus rotundus*. Poster presented at the annual meeting of Society for Neuroscience, San Diego, CA.
- Wasserman, E. A., Brooks, D. I., Lazareva, O. F., & Miner, M. A.. (2007, November). *A vocabulary test for pigeons (Columba livia)*. Paper presented at the meeting of Psychonomic Society, Long Beach, CA.

- Wasserman, E. A., Lazareva, O. F., & Young, M. E. (September, 2007). *Spence and transposition: 1937 to 2007*. Paper presented at the “Learning and Behavior: A Tribute to Kenneth W. Spence” conference, Iowa City, IA.
- Wasserman, E. A., & Lazareva, O. F. (2007, March). *Pigeons are more sensitive to nonaccidental than to metric changes in visual objects*. Paper presented at the meeting of Comparative Cognition Society, Melbourne, FL.
- Acerbo, M. J., Lazareva, O. F., Frank, A., Poremba, A., & Wasserman, E. A. (2007, March). *Metabolic mapping of brain structures involved in figure-ground assignment in pigeons*. Paper presented at the meeting of Comparative Cognition Society, Melbourne, FL.
- Lazareva, O. F., Doyle, J., & Wasserman, E. A. (2007, March). *Pigeons’ perception of similarity among different basic-level categories*. Paper presented at the meeting of Comparative Cognition Society, Melbourne, FL.
- Lazareva, O. F., Young, M. E., & Wasserman, E. A. (2007, February). *A three-component model of relational learning in transposition paradigm*. Paper presented at the meeting of Winter Conference on Animal Learning and Behavior, Winter Park, CO.
- Wasserman, E. A., Nagasaka, Y., & Lazareva, O. F. (2006, August). *Seeing the unseen: Visual completion in pigeons?* Paper presented at the meeting of American Psychological Association, New Orleans, LA.
- Wasserman, E. A., Lazareva, O. F., & Luck, S. J. (2006, May). *Change detection in pigeons: Stimulus attributes and binding*. Poster presented at the meeting of the Vision Sciences Society, Sarasota, FL.
- Lazareva, O. F., Castro, L., Vecera, S. P., & Wasserman, E. A. (2006, May). *Figure-ground assignment in pigeons: Smaller area and longer pre-exposure enhance figural advantage*. Poster presented at the meeting of the Vision Sciences Society, Sarasota, FL.
- Nagasaka, Y., Lazareva, O. F., & Wasserman, E. A. (2006, May). *Prior experience affects amodal completion in pigeons*. Poster presented at the meeting of the Vision Sciences Society, Sarasota, FL.
- Brooks, D. I., Lazareva, O. F., Gosselin, F., Schyns, P. G., & Wasserman, E. A. (2006, May). *Stimulus control in categorization: An application of the Bubbles procedure*. Poster presented at the meeting of the Vision Sciences Society, Sarasota, FL.
- Lazareva, O. F., & Wasserman, E. A. (2006, May). *Nonverbal transitive inference: Effects of task and awareness on performance*. Paper presented at the meeting of Midwestern Psychological Association, Chicago, IL.
- Lazareva, O. F., Miner, M., Wasserman, E. A., & Young, M. E. (2006, March). *Transposition in pigeons: Multiple-pair training facilitates relational responding*. Paper presented at the meeting of Comparative Cognition Society, Melbourne, FL.
- Wasserman, E. A., Lazareva, O. F., & Young, M. E. (2005, November). *Transposition in pigeons: Reassessing Spence’s (1937) associative learning theory*. Paper presented at the conference “Associative Learning Today”, Hamilton, Canada.

- Lazareva, O. F., Freiburg, K., & Wasserman, E. A. (2005, May). *Effects of stimulus manipulations on basic-level and superordinate-level categorization. [Invited talk]*. Paper presented at the meeting of the Society for the Quantitative Analyses of Behavior, Chicago, IL.
- Lazareva, O. F., Miner, M., Wasserman, E. A., & Young, M. E. (2005, May). *Transposition in pigeons and people using multiple-pair discrimination training. [Invited talk]*. Paper presented at the meeting of the Association for Behavioral Analysis, Chicago, IL.
- Lazareva, O. F., Castro, L., Vecera, S. P., & Wasserman, E. A. (2005, May). *Figure-ground assignment in pigeons: Effect of object area*. Symposium conducted at the meeting of the Vision Sciences Society, Sarasota, FL.
- Gibson, B. M., Lazareva, O. F., Wasserman, E. A., Gosselin, F., Shyns, P. G., & Biederman, I. (2005, May). *Use of the Bubbles procedures to isolate the visual features controlling categorical behavior in people and pigeons*. Symposium conducted at the meeting of the Vision Sciences Society, Sarasota, FL.
- Wasserman, E. A., Lazareva, O. F., & Biederman, I. (2005, May). *Sensitivity to metric and invariant changes in pigeons: Effects of different behavioral techniques*. Symposium conducted at the meeting of the Vision Sciences Society, Sarasota, FL.
- Castro, L., Lazareva, O. F., Vecera, S. P., & Wasserman, E. A. (2005, March). *Figure-ground assignment in pigeons: The effect of different sizes*. Paper presented at the meeting of Comparative Cognition Society, Melbourne, FL.
- Lazareva, O. F., Vecera, S. P., & Wasserman, E. A. (2005, March). *Figure-ground assignment in pigeons*. Paper presented at the meeting of the Comparative Cognition Society, Melbourne, FL.
- Lazareva, O. F., Vecera, S. P., & Wasserman, E. A. (2004, November). *Figure-ground assignment in pigeons: Evidence for a figural benefit*. Poster presented at the annual workshop on Object Perception, Attention, and Memory (OPAM), Minneapolis, MN.
- Lazareva, O. F., Young, M. E., & Wasserman, E. A. (2004, May). *Pigeon's recognition of occluded objects: Differential effect of training experience*. Paper presented at the meeting of the Vision Sciences Society, Sarasota, FL.
- Wasserman, E. A., Lazareva, O. F., Gibson, B. M., Gosselin, F., Shyns, P. G., & Biederman, I. (2004, May). *Geons and Bubbles: Object recognition by pigeons*. Poster presented at the meeting of the Vision Sciences Society, Sarasota, FL.
- Wasserman, E. A., Lazareva, O. F., & Vecera, S. P. (2004, March). *Object discrimination in pigeons: The roles of global and local cues*. Paper presented at the meeting of Comparative Cognition Society, Melbourne, FL.
- Lazareva, O. F., Freiburg, K., & Wasserman, E. A. (2004, March). *Pigeons concurrently categorize photographs at both basic and superordinate levels*. Paper presented at the meeting of Comparative Cognition Society, Melbourne, FL.
- Lazareva, O. F., Vecera, S. P., & Wasserman, E. A. (2003, November). *Pigeons perform object discrimination using both local and global cues*. Poster presented at the annual workshop on Object Perception, Attention, and Memory (OPAM), Vancouver, Canada.

- Lazareva, O. F., Freiburger, K., & Wasserman, E. A. (2003, March). *Concurrent basic and superordinate categorization of photographic images by pigeons*. Poster presented at the meeting of Psychonomic Society, Vancouver, Canada.
- Lazareva, O. F. & Wasserman, E. A. (2003, March). *Transitive responding in pigeons with reinforcement history controlled*. Paper presented at the meeting of Comparative Cognition Society, Melbourne, FL.
- Wasserman, E. A. & Lazareva, O. F. (2003, March). *Transposition in pigeons*. Paper presented at the meeting of Comparative Cognition Society, Melbourne, FL.
- Wasserman, E. A., Lazareva, O. F., & Vecera, S. P. (2003, September). *Object perception in pigeons: Control by color versus shape*. Symposium on the "Diversity of cognition: Evolution, development, domestication, and pathology", Kyoto, Japan.
- Lazareva, O. F., Bagozkaja, M. S., Zorina, Z. A., & Rayevsky, V. V. (2002, March). *Transitive inference in hooded crows (Corvus cornix L.)*. Paper presented at the meeting of Comparative Cognition Society, Melbourne, FL.
- Lazareva, O. F. & Wasserman, E. A. (2002, November). *Transposition in pigeons and people?* Poster presented at the meeting of Psychonomic Society, Kansas City, KS.
- Lazareva, O. F. & Wasserman, E. A. (2002, November). *Object-based attention in pigeons?* Poster presented at the annual workshop on Object Perception, Attention, and Memory (OPAM), Kansas City, KS.
- Zorina, Z. A., Lazareva, O. F., Mandriko, E. V., Pleskacheva, M. G., & Smirnova, A. A. (2002, June). *Cognitive abilities of corvids*. Paper presented at the 6th Conference for Ornithologists from Commonwealth of Independent States, Stavropol, Russia.
- Bagozkaja, M. S., Lazareva, O. F., Smirnova, A. A., Zorina, Z. A., & Rayevsky, V. V. (2002, June). *Some characteristics of transitive inference in hooded crows*. Paper presented at the 6th Conference for Ornithologists from Commonwealth of Independent States, Stavropol, Russia.
- Lazareva, O. F., Smirnova, A. A., Bagozkaja, M. S., & Zorina, Z. A. (2000, July). *Hooded crows are capable of transitive inference formation*. Poster presented at the 4th European Meeting for the Experimental Analysis of Behavior, Amiens, France.
- Lazareva, O. F., Smirnova, A. A., Michnevich, N. V., Zorina, Z. A., & Reznikova, Zh. I. (2000, July). *Piagetian object permanence in young hooded crows and budgerigars*. Poster presented at the 4th European Meeting for the Experimental Analysis of Behavior, Amiens, France.
- Lazareva, O. F., Smirnova, A. A., Michnevich, N. V., Zorina, Z. A., & Reznikova, Zh. I. (2000, May). *Object permanence in young hooded crows and budgerigars*. Poster presented at the meeting of the Universities Federation for Animal Welfare (UFAW), London, UK.
- Lazareva, O. F., Smirnova, A. A., Zorina, Z. A., & Rayevsky, V. V. (2000, May). *Hooded crows can solve transitive inference task cognitively*. Paper presented at the meeting of the Universities Federation for Animal Welfare (UFAW), London, UK.
- Lazareva, O. F., Smirnova, A. A., & Zorina, Z. A. (2000, January). *Transitive inference in hooded crows*. Paper presented at the Lomonosov's Conference of Moscow State University, Moscow, Russia.

- Lazareva, O. F., Bagozkaja, M. S., Michnevich, N. V., & Smirnova, A. A. (2000, March). *Comparative analysis of object permanence in adult pigeons and crow youngsters*. Paper presented at the Young Scientists Conference of the Institute of Higher Nervous Activity, Moscow, Russia.
- Lazareva, O. F., Smirnova, A. A., & Michnevich, N. V. (1999, March). *Object permanence in hooded crows from 1 to 3 months of age*. Paper presented at the Young Scientists Conference of the Institute of Higher Nervous Activity dedicated to the jubilee of I. P. Pavlov, Moscow, Russia.
- Lazareva, O. F., Smirnova, A. A., & Zorina, Z. A. (1999, June). *Hooded crows are capable of transitive inference formation*. Paper presented at the 5th Conference for Ornithologists from Commonwealth of Independent States, Stavropol, Russia.
- Perepelkina, O. V. & Lazareva, O. F. (1999, June). *Diagnostics, treatment, and prevention of coccidiosis in captive young hooded crows (Corvus cornix L.)*. Paper presented at the 5th Conference for Ornithologists from Commonwealth of Independent States, Stavropol, Russia.
- Lazareva, O. F. & Smirnova, A. A. (1998, March). *Investigation of ability of hooded crows to the logical operation: Transitive inference formation*. Paper presented at the Young Scientists Conference of the Institute of Higher Nervous Activity dedicated to the jubilee of Rusinov, Moscow, Russia.
- Smirnova, A. A. & Lazareva, O. F. (1998, March). *Abstract rules in hooded crows*. Paper presented at the Young Scientists Conference of the Institute of Higher Nervous Activity dedicated to the jubilee of Voronin, Moscow, Russia.
- Smirnova, A. A. & Lazareva, O. F. (1997, March). *Abstract rules in hooded crows*. Paper presented at the Young Scientists Conference of the Institute of Higher Nervous Activity dedicated to the jubilee of Livanov, Moscow, Russia.

## REFERENCES

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