

PSYC G4675 – Animal Personality
Preliminary syllabus, subject to revision

Becca Franks, PhD
Fall 2012

A comprehensive overview of the study of personality in nonhuman animals. Discussions and readings will cover theoretical principles, methodological approaches, the range of species in which personality-like phenomena are documented, and the intersection between personality, ecology, and evolution.

General Information:

Mondays 12:10 PM – 2:00 PM

Location: Schermerhorn Hall

Credit: 4 pts.

Prerequisites: At least two psychology courses and the instructor's permission.

Instructor:

(Kathryn) Becca Franks

Postdoc & Lecturer

Psychology Department

329 Schermerhorn

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Textbook & Readings:

There will be no textbook for this class.

All readings will be posted on CourseWorks.

Course Description:

As pet owners (or friends of pet owners), we have no problem talking about the cheerful or laid-back personality of our nonhuman companions. As scientists, however, we might be skeptical of such classifications, especially in animals like guppies, sheep, or honeybees. But what is the empirical evidence of personality in nonhuman animals? For that matter, what do we mean when we talk about personality in science? What role does it play in evolution? How can we understand personality from an ecological perspective? The study of animal personality touches on all these questions and raises several more.

In this course, we will examine the research and theory related to the study of animal personality. Readings will include selections from the current scientific literature, book chapters, and review articles. In particular, we will cover the theoretical foundations of personality, survey the range of species in which personality or personality-like phenomenon are scientifically documented, and explore the interaction between personality and environment.

Each week, students will write a response to the readings and actively participate in the discussion. Students will also create two 15-minute presentations critically examining a paper of their choice and lead class discussion on their presentation. At the end of the semester, students will submit a final paper that either identifies a promising area for future research or contributes a novel idea to the existing literature.

Assignments and grading:

Grade breakdown:

- Response papers (15%)
- Class attendance and participation (15%)
- Section B presentation (15%)
- Section D presentation (20%)
- Final paper presentation (10%)
- Final paper (25%)

Late/absence policy

Because so much of what students will get out of this course (including the grade) comes from the seminar discussions, students should plan to attend every class. Any missed classes must be thoroughly explained and justified (for example, serious illness or family emergencies), preferably beforehand. All assignments are due at the beginning of class. Late papers will receive one mark down per day late (for example, a B+ will drop to B, then to B-, then to C+, etc.).

Response papers:

Each week, students will write a one-page paper (double-spaced) in response to the readings. These papers should demonstrate active engagement with the material by raising questions, connections, confusion, problems, unexpected findings, and implications of the research. Students do not have to write a response paper on days when they are giving a presentation, so there will be 9 response papers during the semester.

Participation in class discussions:

Students will be expected to attend and actively participate in every class meeting.

Presentations:

Students will give two 15 minute presentations, one in Section B and one in Section D, on the topics they have chosen within each section. Each presentation will be related to an article they pick for the class to read. In the presentation, they should introduce the research area, critically discuss the methods and results, evaluate the conclusions, and hypothesize about future directions. To supplement their understanding of the chosen article and to contextualize it, they will be responsible for investigating the relevant background literature. After giving their presentation, students will lead a class discussion of the article and topic.

On the day students give their Section D presentations, they will also submit an outline of the final paper (see below) and will briefly discuss its relationship to the article and/or topic of their presentation.

Final paper presentation:

On the last day of class, students will present a brief, verbal summary of their final paper.

Final paper:

On the last day of class, the final paper (10-12 pages, double spaced, not counting references) will be due. The paper should build on the ideas and presentations generated throughout the term. It may take one of the following two forms: 1) A research proposal in which they identify a promising area for future research or 2) A review of the current literature that contributes a novel perspective on a body of research. Students will submit an outline of the paper on the day they give their Section D presentations and will briefly discuss its relationship to the article and/or topic of their presentation.

Weekly plan:

Week 1 Course Introduction

- * discussion of topics, course requirements, instructions for giving a good presentation and details of what is expected for the final paper
- * go through syllabus
- * set up poll for section B&D presentations (name 1st choice for section B&D, make list of other choices)

Week 2 Section A: Theoretical Issues

- * survey of the principles and key questions in animal personality research
- * finalize section B&D presentations (those who didn't get 1st choice in section B will get first priority for section D)

READINGS (subject to modification):

Gosling, S. D. (2001). From mice to men: What can we learn about personality from animal research? *Psychological Bulletin*, 127(1), 45-86.

Nettle, D., & Penke, L. (2010). Personality: bridging the literatures from human psychology and behavioural ecology. *Philosophical Transactions of the Royal Society B-Biological Sciences*, 365(1560), 4043-4050. doi: 10.1098/rstb.2010.0061

Uher, J. (2011). Individual Behavioral Phenotypes: An Integrative Meta-Theoretical Framework. Why "Behavioral Syndromes" Are Not Analogs of "Personality". *Developmental Psychobiology*, 53(6), 521-548. doi: 10.1002/dev.20544

Sih, A., Bell, A. M., Johnson, J. C., & Ziemba, R. E. (2004). Behavioral syndromes: An integrative overview. [Review]. *Quarterly Review of Biology*, 79(3), 241-277.

Week 3 Section A: Statistical and Methodological Approaches

- * examining the range of methodology in animal personality research

READINGS (subject to modification):

Bell, A. M. (2007). Future directions in behavioural syndromes research.

Dingemanse, N. J., Kazem, A. J. N., Reale, D., & Wright, J. (2010). Behavioural reaction norms: animal personality meets individual plasticity. *Trends in Ecology & Evolution*, 25(2), 81-89. doi: 10.1016/j.tree.2009.07.013

Bell, A. M., Hankison, S. J., & Laskowski, K. L. (2009). The repeatability of behaviour: a meta-analysis. *Animal Behaviour*, 77(4), 771-783. doi: 10.1016/j.anbehav.2008.12.022

Dingemanse, N. J., Dochtermann, N., & Wright, J. (2010). A method for exploring the structure of behavioural syndromes to allow formal comparison within and between data sets. *Animal Behaviour*, 79(2), 439-450. doi: 10.1016/j.anbehav.2009.11.024

Week 4 Section B: Mammals

- * student presentations (3-4 per class) on personality research in mammals
- * each student must present once during Section B

READINGS (subject to modification):

-selected by student presenters from reference list at the end of the syllabus

Week 5 Section B: Birds and Reptiles

- * student presentations (3-4 per class) on personality research in birds and reptiles
- * each student must present once during Section B

READINGS (subject to modification):

-selected by student presenters from reference list at the end of the syllabus

Week 6 Section B: Fish

- * student presentations (3-4 per class) on personality research in fish
- * each student must present once during Section B

READINGS (subject to modification):

-selected by student presenters from reference list at the end of the syllabus

Week 7 Section B: Invertebrates

- * student presentations (3-4 per class) on personality research in invertebrates
- * each student must present once during Section B

READINGS (subject to modification):

-selected by student presenters from reference list at the end of the syllabus

Week 8 Section C: Ecology and Evolution

- * contextualizing animal personality within evolutionary theory and ecology

READINGS (subject to modification):

Nussey, D. H., Wilson, A. J., & Brommer, J. E. (2007). The evolutionary ecology of individual phenotypic plasticity in wild populations. *Journal of Evolutionary Biology*, 20(3), 831-844. doi: 10.1111/j.1420-9101.2007.01300.x

Reale, D., Dingemans, N. J., Kazem, A. J. N., & Wright, J. (2010). Evolutionary and ecological approaches to the study of personality. *Philosophical Transactions of the Royal Society B-Biological Sciences*, 365(1560), 3937-3946. doi: 10.1098/rstb.2010.0222

Sih, A., & Bell, A. M. (2008). Insights for behavioral ecology from behavioral syndromes. *Advances in the Study of Behavior*, Vol 38, 38, 227-281. doi: 10.1016/s0065-3454(08)00005-3

Wolf, M., & Weissing, F. J. (2010). An explanatory framework for adaptive personality differences. *Philosophical Transactions of the Royal Society B-Biological Sciences*, 365(1560), 3959-3968. doi: 10.1098/rstb.2010.0215

Biro, P. A., & Stamps, J. A. (2008). Are animal personality traits linked to life-history productivity? *Trends in Ecology & Evolution*, 23(7), 361-368. doi: 10.1016/j.tree.2008.04.003

Schuett, W., Tregenza, T., & Dall, S. R. X. (2010). Sexual selection and animal personality. *Biological Reviews*, 85(2), 217-246. doi: 10.1111/j.1469-185X.2009.00101.x

Sih, A., Cote, J., Evans, M., Fogarty, S., & Pruitt, J. (2012). Ecological implications of behavioural syndromes. *Ecology Letters*, 15(3), 278-289. doi: 10.1111/j.1461-0248.2011.01731.x

Smith, B. R., & Blumstein, D. T. (2008). Fitness consequences of personality: a meta-analysis. [Review]. *Behavioral Ecology*, 19(2), 448-455. doi: 10.1093/beheco/arm144

Week 9 Section D: Biological Basis

- * student presentations (3-4 per class) on the biological basis of personality
- * each student must present once during Section D

READINGS (subject to modification):

-selected by student presenters from reference list at the end of the syllabus

Week 10 Section D: Development

- * student presentations (3-4 per class) on the developmental origins of personality
- * each student must present once during Section D

READINGS (subject to modification):

-selected by student presenters from reference list at the end of the syllabus

Week 11 Section D: Social Environment

- * student presentations (3-4 per class) on the relationship between the social environment and animal personality
- * each student must present once during Section D

READINGS (subject to modification):

-selected by student presenters from reference list at the end of the syllabus

Week 12 Section D: Animal Welfare

- * student presentations (3-4 per class) on the relationship between animal welfare and personality
- * each student must present once during Section D

READINGS (subject to modification):

-selected by student presenters from reference list at the end of the syllabus

Week 13 Course Summary

- * review of course; presentation and discussion of final projects
- * class time may be extended to accommodate all presentations

Reference list for student presentations:

Section B: Mammals

- Freeman, H. D., & Gosling, S. D. (2010). Personality in Nonhuman Primates: A Review and Evaluation of Past Research. *American Journal of Primatology*, 72(8), 653-671. doi: 10.1002/ajp.20833
- Itoh, K. (2002). Personality research with non-human primates: Theoretical formulation and methods. *Primates*, 43(3), 249-261. doi: 10.1007/bf02629652
- Diederich, C., & Giffroy, J. M. (2006). Behavioural testing in dogs: A review of methodology in search for standardisation. *Applied Animal Behaviour Science*, 97(1), 51-72. doi: 10.1016/j.applanim.2005.11.018
- Capitanio, J. P. (1999). Personality dimensions in adult male rhesus macaques: Prediction of behaviors across time and situation. *American Journal of Primatology*, 47(4), 299-320. doi: 10.1002/(sici)1098-2345(1999)47:4<299::aid-ajp3>3.0.co;2-p
- Gosling, S. D. (1998). Personality dimensions in spotted hyenas (*Crocuta crocuta*). *Journal of Comparative Psychology*, 112(2), 107-118. doi: 10.1037/0735-7036.112.2.107
- Gosling, S. D., Kwan, V. S. Y., & John, O. P. (2003). Dog's got personality: A cross-species comparative approach to personality judgments in dogs and humans. *Journal of Personality and Social Psychology*, 85(6), 1161-1169. doi: 10.1037/0022-3514.85.6.1161
- Jones, A. C., & Gosling, S. D. (2005). Temperament and personality in dogs (*Canis familiaris*): A review and evaluation of past research. *Applied Animal Behaviour Science*, 95(1-2), 1-53. doi: 10.1016/j.applanim.2005.04.008
- Martin, J. G. A., & Reale, D. (2008). Temperament, risk assessment and habituation to novelty in eastern chipmunks, *Tamias striatus*. *Animal Behaviour*, 75, 309-318. doi: 10.1016/j.anbehav.2007.05.026
- Reale, D., Gallant, B. Y., Leblanc, M., & Festa-Bianchet, M. (2000). Consistency of temperament in bighorn ewes and correlates with behaviour and life history. *Animal Behaviour*, 60, 589-597. doi: 10.1006/anbe.2000.1530
- Svartberg, K. (2005). A comparison of behaviour in test and in everyday life: evidence of three consistent boldness-related personality traits in dogs. *Applied Animal Behaviour Science*, 91(1-2), 103-128. doi: 10.1016/j.applanim.2004.08.030
- Svartberg, K. (2006). Breed-typical behaviour in dogs - Historical remnants or recent constructs? *Applied Animal Behaviour Science*, 96(3-4), 293-313. doi: 10.1016/j.applanim.2005.06.014
- Svartberg, K., & Forkman, B. (2002). Personality traits in the domestic dog (*Canis familiaris*). *Applied Animal Behaviour Science*, 79(2), 133-155. doi: 10.1016/s0168-1591(02)00121-1

Svartberg, K., Tapper, I., Temrin, H., Radesater, T., & Thorman, S. (2005). Consistency of personality traits in dogs. *Animal Behaviour*, *69*, 283-291. doi: 10.1016/j.anbehav.2004.04.011

Uher, J., Asendorpf, J. B., & Call, J. (2008). Personality in the behaviour of great apes: temporal stability, cross-situational consistency and coherence in response. *Animal Behaviour*, *75*(1), 99.

Section B: Birds/Reptiles

Betini, G. S., & Norris, D. R. (2012). The relationship between personality and plasticity in tree swallow aggression and the consequences for reproductive success. *Animal Behaviour*, *83*(1), 137-143. doi: 10.1016/j.anbehav.2011.10.018

Both, C., Dingemans, N. J., Drent, P. J., & Tinbergen, J. M. (2005). Pairs of extreme avian personalities have highest reproductive success. [Article]. *Journal of Animal Ecology*, *74*(4), 667-674. doi: 10.1111/j.1365-2656.2005.00962.x

Van Oers, K., Drent, P. J., Dingemans, N. J., & Kempenaers, B. (2008). Personality is associated with extrapair paternity in great tits, *Parus major*. *Animal Behaviour*, *76*, 555-563. doi: 10.1016/j.anbehav.2008.03.011

Brodie, E. D., & Russell, N. H. (1999). The consistency of individual differences in behaviour: temperature effects on antipredator behaviour in garter snakes. *Animal Behaviour*, *57*, 445-451. doi: 10.1006/anbe.1998.0990

Carere, C., Drent, P. J., Privitera, L., Koolhaas, J. M., & Groothuis, T. G. G. (2005). Personalities in great tits, *Parus major*: stability and consistency. [Article]. *Animal Behaviour*, *70*, 795-805. doi: 10.1016/j.anbehav.2005.01.003

Cote, J., & Clobert, J. (2007). Social personalities influence natal dispersal in a lizard. *Proceedings of the Royal Society B-Biological Sciences*, *274*(1608), 383-390. doi: 10.1098/rspb.2006.3734

Dingemans, N. J., Both, C., Drent, P. J., & Tinbergen, J. M. (2004). Fitness consequences of avian personalities in a fluctuating environment. [Article]. *Proceedings of the Royal Society of London Series B-Biological Sciences*, *271*(1541), 847-852. doi: 10.1098/rspb.2004.2680

Dingemans, N. J., Both, C., Drent, P. J., Van Oers, K., & Van Noordwijk, A. J. (2002). Repeatability and heritability of exploratory behaviour in great tits from the wild. [Article]. *Animal Behaviour*, *64*, 929-938. doi: 10.1006/anbe.2002.2006

Drent, P. J., van Oers, K., & van Noordwijk, A. J. (2003). Realized heritability of personalities in the great tit (*Parus major*). *Proceedings of the Royal Society of London Series B-Biological Sciences*, *270*(1510), 45-51. doi: 10.1098/rspb.2002.2168

Kralj-Fiser, S., Scheiber, I. B. R., Blejec, A., Mostl, E., & Kotrschal, K. (2007). Individualities in a flock of free-roaming greylag geese: Behavioral and physiological consistency over time and across situations. *Hormones and Behavior*, 51(2), 239-248. doi: 10.1016/j.yhbeh.2006.10.006

Lopez, P., Hawlena, D., Polo, V., Amo, L., & Martin, J. (2005). Sources of individual shy-bold variations in antipredator behaviour of male Iberian rock lizards. [Article]. *Animal Behaviour*, 69, 1-9. doi: 10.1016/j.anbehav.2004.05.010

Quinn, J. L., & Cresswell, W. (2005). Part 9-10.

Section B: Fish

Bell, A. M. (2005). Behavioural differences between individuals and two populations of stickleback (*Gasterosteus aculeatus*). *Journal of Evolutionary Biology*, 18(2), 464-473. doi: 10.1111/j.1420-9101.2004.00817.x

Bell, A. M., & Stamps, J. A. (2004). Development of behavioural differences between individuals and populations of sticklebacks, *Gasterosteus aculeatus*. *Animal Behaviour*, 68, 1339-1348. doi: 10.1016/j.anbehav.2004.05.007

Coleman, K., & Wilson, D. S. (1998). Shyness and boldness in pumpkinseed sunfish: individual differences are context-specific. *Animal Behaviour*, 56, 927-936. doi: 10.1006/anbe.1998.0852

Conrad, J. L., Weinersmith, K. L., Brodin, T., Saltz, J. B., & Sih, A. (2011). Behavioural syndromes in fishes: a review with implications for ecology and fisheries management. *Journal of Fish Biology*, 78(2), 395-435. doi: 10.1111/j.1095-8649.2010.02874.x

Cote, J., Fogarty, S., Weinersmith, K., Brodin, T., & Sih, A. (2010). Personality traits and dispersal tendency in the invasive mosquitofish (*Gambusia affinis*). *Proceedings of the Royal Society B-Biological Sciences*, 277(1687), 1571-1579. doi: 10.1098/rspb.2009.2128

Dingemanse, N. J., Wright, J., Kazem, A. J. N., Thomas, D. K., Hickling, R., & Dawnay, N. (2007). Behavioural syndromes differ predictably between 12 populations of three-spined stickleback. [Article]. *Journal of Animal Ecology*, 76(6), 1128-1138. doi: 10.1111/j.1365-2656.2007.01284.x

Edenbrow, M., & Croft, D. P. (2011). Behavioural types and life history strategies during ontogeny in the mangrove killifish, *Kryptolebias marmoratus*. *Animal Behaviour*, 82(4), 731-741. doi: 10.1016/j.anbehav.2011.07.003

Farwell, M., & McLaughlin, R. L. (2009). Alternative foraging tactics and risk taking in brook charr (*Salvelinus fontinalis*). *Behavioral Ecology*, 20(5), 913-921. doi: 10.1093/beheco/arp059

Huntingford, F. A., Andrew, G., Mackenzie, S., Morera, D., Coyle, S. M., Pilarczyk, M., & Kadri, S. (2010). Coping strategies in a strongly schooling fish, the common carp *Cyprinus carpio*. *Journal of Fish Biology*, 76(7), 1576-1591. doi: 10.1111/j.1095-8649.2010.02582.x

Jones, K. A., & Godin, J. G. J. (2010). Are fast explorers slow reactors? Linking personality type and anti-predator behaviour. [Article]. *Proceedings of the Royal Society B-Biological Sciences*, 277(1681), 625-632. doi: 10.1098/rspb.2009.1607

Ruiz-Gomez, M. D., Kittilsen, S., Hoglund, E., Huntingford, F. A., Sorensen, C., Pottinger, T. G., . . . Overli, O. (2008). Behavioral plasticity in rainbow trout (*Oncorhynchus mykiss*) with divergent coping styles: When doves become hawks. [Article]. *Hormones and Behavior*, 54(4), 534-538. doi: 10.1016/j.yhbeh.2008.05.005

Wilson, A. D. M., & Stevens, E. D. (2005). Consistency in context-specific measures of shyness and boldness in rainbow trout, *Oncorhynchus mykiss*. [Article]. *Ethology*, 111(9), 849-862.

Wilson, D. S., Coleman, K., Clark, A. B., & Biederman, L. (1993). SHY BOLD CONTINUUM IN PUMPKINSEED SUNFISH (*LEPOMIS-GIBBOSUS*) - AN ECOLOGICAL STUDY OF A PSYCHOLOGICAL TRAIT. [Article]. *Journal of Comparative Psychology*, 107(3), 250-260.

Witsenburg, F., Schurch, R., Otti, O., & Heg, D. (2010). Behavioural types and ecological effects in a natural population of the cooperative cichlid *Neolamprologus pulcher*. [Article]. *Animal Behaviour*, 80(4), 757-767. doi: 10.1016/j.anbehav.2010.07.016

Section B: Invertebrates

Sinn, D. L., & Moltschaniwskyj, N. A. (2005). Personality traits in dumpling squid (*Euprymna tasmanica*): Context-specific traits and their correlation with biological characteristics. *Journal of Comparative Psychology*, 119(1), 99-110. doi: 10.1037/0735-7036.119.1.99

Briffa, M., Rundle, S. D., & Fryer, A. (2008). Comparing the strength of behavioural plasticity and consistency across situations: animal personalities in the hermit crab *Pagurus bernhardus*. [Article]. *Proceedings of the Royal Society B-Biological Sciences*, 275(1640), 1305-1311. doi: 10.1098/rspb.2008.0025

Brodin, T. (2009). Behavioral syndrome over the boundaries of life-025EFcarryovers from larvae to adult damselfly. *Behavioral Ecology*, 20(1), 30-37. doi: 10.1093/beheco/arn111

Chapman, B. B., Thain, H., Coughlin, J., & Hughes, W. O. H. (2011). Behavioural syndromes at multiple scales in *Myrmica* ants. *Animal Behaviour*, 82(2), 391-397. doi: 10.1016/j.anbehav.2011.05.019

- Hedrick, A. V., & Kortet, R. (2012). Sex differences in the repeatability of boldness over metamorphosis. *Behavioral Ecology and Sociobiology*, *66*(3), 407-412. doi: 10.1007/s00265-011-1286-z
- Johnson, J. C., & Sih, A. (2005). Precopulatory sexual cannibalism in fishing spiders (*Dolomedes triton*): a role for behavioral syndromes. *Behavioral Ecology and Sociobiology*, *58*(4), 390-396. doi: 10.1007/s00265-005-0943-5
- Johnson, J. C., & Sih, A. (2007). Fear, food, sex and parental care: a syndrome of boldness in the fishing spider, *Dolomedes triton*. *Animal Behaviour*, *74*, 1131-1138. doi: 10.1016/j.anbehav.2007.02.006
- Peckarsky, B. L. (1996). Alternative predator avoidance syndromes of stream-dwelling mayfly larvae. *Ecology*, *77*(6), 1888-1905. doi: 10.2307/2265792
- Sinn, D. L., Apiolaza, L. A., & Moltschaniwskyj, N. A. (2006). Heritability and fitness-related consequences of squid personality traits. *Journal of Evolutionary Biology*, *19*(5), 1437-1447. doi: 10.1111/j.1420-9101.2006.01136.x
- Sinn, D. L., Perrin, N. A., Mather, J. A., & Anderson, R. C. (2001). Early temperamental traits in an octopus (*Octopus bimaculoides*). *Journal of Comparative Psychology*, *115*(4), 351-364. doi: 10.1037//0735-7036.115.4.351
- Wray, M. K., Mattila, H. R., & Seeley, T. D. (2011). Collective personalities in honeybee colonies are linked to colony fitness. *Animal Behaviour*, *81*(3), 559-568. doi: 10.1016/j.anbehav.2010.11.027

Section D: Biology

- Korsten, P., Mueller, J. C., Hermannstadter, C., Bouwman, K. M., Dingemanse, N. J., Drent, P. J., . . . Kempenaers, B. (2010). Association between DRD4 gene polymorphism and personality variation in great tits: a test across four wild populations. *Molecular Ecology*, *19*(4), 832-843. doi: 10.1111/j.1365-294X.2009.04518.x
- Barber, I., & Dingemanse, N. J. (2010). Parasitism and the evolutionary ecology of animal personality. *Philosophical Transactions of the Royal Society B-Biological Sciences*, *365*(1560), 4077-4088. doi: 10.1098/rstb.2010.0182
- Bouchard, T. J., & Loehlin, J. C. (2001). Genes, evolution, and personality. *Behavior Genetics*, *31*(3), 243-273.
- Penke, L., Denissen, J. J. A., & Miller, G. F. (2007). The evolutionary genetics of personality. *European Journal of Personality*, *21*(5), 549-587. doi: 10.1002/per.629
- Biro, P. A., & Stamps, J. A. (2010). Do consistent individual differences in metabolic rate promote consistent individual differences in behavior? *Trends in Ecology & Evolution*, *25*(11), 653-659. doi: 10.1016/j.tree.2010.08.003
- Careau, V., Bininda-Emonds, O. R. P., Thomas, D. W., Reale, D., & Humphries, M. M. (2009). Exploration strategies map along fast-slow metabolic and life-history continua in muroid rodents. *Functional Ecology*, *23*(1), 150-156. doi: 10.1111/j.1365-2435.2008.01468.x

Careau, V., Thomas, D., Humphries, M. M., & Reale, D. (2008). Energy metabolism and animal personality. *Oikos*, *117*(5), 641-653. doi: 10.1111/j.0030-1299.2008.16513.x

Carere, C., Groothuis, T. G. G., Mostl, E., Daan, S., & Koolhaas, J. M. (2003). Fecal corticosteroids in a territorial bird selected for different personalities: daily rhythm and the response to social stress. *Hormones and Behavior*, *43*(5), 540-548. doi: 10.1016/s0018-506x(03)00065-5

Ellis, B. J., Jackson, J. J., & Boyce, W. T. (2006). The stress response systems: Universality and adaptive individual differences. *Developmental Review*, *26*(2), 175-212. doi: 10.1016/j.dr.2006.02.004

Fidler, A. E., van Oers, K., Drent, P. J., Kuhn, S., Mueller, J. C., & Kempenaers, B. (2007). Drd4 gene polymorphisms are associated with personality variation in a passerine bird. *Proceedings of the Royal Society B-Biological Sciences*, *274*(1619), 1685-1691. doi: 10.1098/rspb.2007.0337

Ruuskanen, S., & Laaksonen, T. (2010). Yolk hormones have sex-specific long-term effects on behavior in the pied flycatcher (*Ficedula hypoleuca*). *Hormones and Behavior*, *57*(2), 119-127. doi: 10.1016/j.yhbeh.2009.09.017

van Oers, K., de Jong, G., van Noordwijk, A. J., Kempenaers, B., & Drent, P. J. (2005). Contribution of genetics to the study of animal personalities: a review of case studies. *Behaviour*, *142*, 1185-1206. doi: 10.1163/156853905774539364

Section D: Development

Stamps, J. A. (2007). Growth-mortality tradeoffs and 'personality traits' in animals. *Ecology Letters*, *10*(5), 355-363. doi: 10.1111/j.1461-0248.2007.01034.x

Stamps, J. A., & Groothuis, T. G. G. (2010). Developmental perspectives on personality: implications for ecological and evolutionary studies of individual differences. *Philosophical Transactions of the Royal Society B-Biological Sciences*, *365*(1560), 4029-4041. doi: 10.1098/rstb.2010.0218

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