

Psychology 3S03
Animal Behaviour Laboratory

Monday section: September 10 – December 3, 2007

Location: Psychology 116 & 204

Time: Mondays 11.30-14.20

Instructor: Dr. Margo Wilson

PC109

wilson@mcmaster.ca

Office Hours: To be arranged.

Teaching Assistants:

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Office Hours: to be arranged.

Psy 3F3 Website: <http://www.science.mcmaster.ca/Psychology/psych3s3mw/>

[Learn Link for documents, postings, messages](http://www.learnlink.mcmaster.ca)

<http://www.learnlink.mcmaster.ca>

Course description and objectives

Animal behaviour enjoys prime-time TV status, and while you've probably been amazed by the photographer's talents you've had your doubts about some of the commentary. With a little experience in the study of animal behaviour you can acquire a critical appreciation of how high-quality animal behaviour research is done. You can also acquire an appreciation of the lives of several species. What kinds of everyday problems do they face and how do they solve these challenges? There are several kinds of challenges that almost every animal faces: finding food, avoiding being someone else's dinner, attracting a mate, choosing a mate, being a good parent, being a fair cooperator, doing better than your competitor. In this course, there will be opportunities for behavioural studies in both the field and the laboratory with a variety of species including Canada geese, black-capped chickadees, grey squirrels, zebra fish, house sparrows, Siamese Fighting Fish, and humans. Research topics include social competition, aggression, anti-predator strategies, risk-taking, altruism, mate choice, and foraging for food.

While developing an appreciation of animal behavior research, natural history, and the social/ecological context of where the animal lives, you will be improving your skills in critical thinking, problem solving, and scientific reasoning. You will also be improving your skills in collaborative and cooperative learning and research, in behavioural observation techniques, in developing empirically testable hypotheses, in developing appropriate research methodologies, in analyzing data, in interpreting research findings, and in communicating research questions and findings. You will have the opportunity to

master skills appropriate to writing research reports, grant proposals, ethics applications, and research talks.

Course Content

This course entails studies of animal behaviour in both the laboratory and the field. There is no textbook for the course, but you will be required to research and read relevant primary research literature. Everyone will participate in the observation and recording of behaviour. Everyone will participate in the research projects. For the class projects, observations will be contributed by everyone for statistical analysis and discussion. In addition, everyone will plan and conduct a group research project. For group projects, observations will be contributed by everyone in the group. The group project will focus on the collection of primary data to address a particular hypothesis (or hypotheses). Research team members will work together in planning their research projects and in the collection of their data. All members of a group will each submit a research proposal for the group project, but the final research plan for the group project may be somewhat different after discussion about details of the methodology. Each group will present their research plans to the class for discussion. Submission of an ethics review application outlining the proposed protocol for each group project must be submitted to the instructor for approval before data collection begins.

Coordination of group research project data collection and exchange of information will be facilitated through the course folder on Learn Link (www.learnlink.mcmaster.ca) to which all registered students have access. If you are unfamiliar with this program there is help information at the Learn Link site.

Assignments

Class Projects

Class Projects 1 & 2 (15% each part for a total of 30%): Each person will submit a written report of the project utilizing the data collected by everyone in the class. In order to develop skills in scientific report writing, the paper will include an introduction, description of methods, summary of results, and discussion of the findings. This is a short report (4 double-spaced pages or less than 900 words). Models for this kind of short report are publications in several primary research journals such as *Science*, *Nature*, *Proceedings of the Royal Society of London Series B*, *Biology Letters*, *Psychological Science*.

Reports will vary even though everyone is analyzing the same set of data as people will vary in their interpretations of the findings, in their criticisms of the study, in their suggestions for future work, in their selection of relevant literature, and in their styles and points of view.

Group Research Project

Research Proposal (15%): Each person will submit a written proposal for the group research project. This is a short research proposal (4 double-spaced pages or less than 900 words) outlining the rationale for the study, the specific hypotheses, the proposed methodology (description of subjects, protocol, research design and statistical methods), and anticipated interpretations of the findings. The actual project's hypotheses and methodology will be discussed and coordinated among group members in consultation with the instructor and teaching assistants. The purpose of the written research proposal is to develop skill in grant and scholarship writing and to develop a well-planned group research project.

A Research Ethics Application will be appended to the research proposal. The ethics application will be completed by everyone in the group.

[AUP application and field application or PSREC application](#)

In any research project the investigator is concerned with the ethical treatment of the animal (including *Homo sapiens*) they are studying. There are federal standards for assuring that the animals are safe, healthy, and not subject to undue distress. Like all animal researchers in Canada, you will prepare an ethics application as if it were being submitted to the relevant review panel (see below). This application will be attached to your research proposal.

Two Group Research Talks (10% each for a total of 20%):

The group project will entail each group giving two brief (20 minute) talks to the class. The first talk will describe the planned group project (rationale, hypotheses and methodology), and the second talk will describe your findings and interpretations after a brief introduction to the study and the methodology. Group members participate equally in the presentations and everyone receives the same mark. A research talk gives you an opportunity to communicate the purpose of your study, the methodology, your findings and interpretations, but also entails additional skills. Coordinating the equal participation of all group members is challenging. And, you need to keep the audience's attention and interest. The research talks will aid you in the preparation of your project and in the writing of your research paper.

Individual written research report based on group project (35%):

Each person will write a scientific research paper describing the group project. The data compiled by all members of the group will form the basis of your report. The individual papers within each group will only be similar with respect to the methods and the findings. The papers will vary among group members as people will vary in their introduction to the research project, in their interpretations of the findings, in their criticisms of the study, in their suggestions for future work, in their selection of relevant literature, and in their styles and points of view.

Please note: All written reports and papers submitted for marking by instructor must be formatted as typed double-spaced one-sided 8.5 x 11 inch white bond sheets with 1-inch margins using a 12-point font. All reports and documents for evaluation will be submitted electronically to the instructor (wilson@mcmaster.ca).

Grading Apportionment:

15%	Class Project Part 1 individual written report
15%	Class Project Part 2 individual written report
15%	Individual written proposal of research plan for group project
10%	Group presentation of plans for group research project
10%	Group presentation of Group Research Project findings
35%	Individual written report of group research project
- - -	
100%	Final Mark

Class Projects

There are two class projects. Both projects will be done in the field. The first project is a study of feeding and vigilance in Canada geese. This study will introduce you to behavioural observation methods. Both are naturalistic correlational studies in which we unobtrusively observe the animals and correlate data on feeding to test our hypotheses.

A second field study will entail observation of black-capped chickadees. This project will introduce you to experimental methodologies in which we see the effects of an independent variable on our dependent measures.

The correlational/naturalistic and experimental methodologies used for these two projects will give you the skills to successfully design your group research project.

Vigilance and feeding in Canada geese (*Branta canadensis*).

Possible questions:

- Are vigilance rates and feeding rates correlated with flock size?
- Does time spent being vigilant or feeding vary as a function of position in the flock?
- Do cues of the risk of predation elevate the vigilance rate?
- Does food competition affect vigilance?

We will observe geese on campus and at nearby parks and greenspaces. You will use scan-sampling and focal follow observational methods for this naturalistic correlational study. In general, naturalistic correlational methods of studying behaviour are very powerful methods as long as the researcher is aware of likely confounding factors that can alter the interpretation of any associations among variables. Correlational research methods in natural environments are likely to surpass laboratory experimental methods with respect to ecological validity. See [gooseVigilanceProtocol.pdf](#) for a detailed plan of our study.

Foraging decisions of chickadees, *Poecile carolinensis*: the effect of effort on food preference.

In the fall, the local chickadees are no longer caring for their offspring and male-female dynamics are not at the forefront of their daily agendas. Instead, food is paramount! There are lots of questions one could ask about foraging decisions.

- Do cues of the risk of predation modulate foraging behaviour?
- Do cues of food competition modulate foraging behaviour?
- In food-storing species, do cues of perishability affect food preferences?
- Will an animal accept greater risk of predation for preferred foods?
- Will an animal be more willing to expend effort and time for preferred foods?
- Do handling time and processing effort affect food preferences?

In order to address the last two questions, we will observe and record the behaviour of chickadees at feeding stations in the Royal Botanical Gardens where we offer the birds a choice of two kinds of seeds to establish which type they prefer. We then will partially embed seeds in edible clay to make it harder to collect the seeds. Our experimental independent variable will be the use of clay to embed either the favourite or non-preferred seeds. Our dependent measures will include the number of seeds collected, the number of birds and the time they spend at the feeding station.

See [ForagingDecisionsChickadees.pdf](#) for a detailed plan of our study.

Suggestions for group research projects

Group research projects will address a particular question(s). You will develop an hypothesis (or hypotheses) based on (i) theoretically interesting questions, (ii) on what has been studied, and (iii) on what is known about a particular species. You will make decisions about the methodology that best addresses your hypothesis (or hypotheses). You will likely collect behavioural data using focal-sampling or scan-sampling techniques, and the design and statistical analysis of your study will be based on an experimental or correlational methodology. You will analyze and interpret your data in light of your hypothesis (hypotheses), and discuss the significance of your findings with respect to the question(s) of interest.

Field Studies

Foraging for food

You will have seen two species of local animals and observed them foraging for food. There are many other research questions one could pursue about foraging with these same species or others.

Possible questions:

- Do cues of the risk of predation modulate foraging behaviour?
- Can the animals' behaviour be used to infer what kinds of predators (e.g. ground or aerial) imposed mortality risks for the animals' ancestors?
- Do cues of food competition modulate foraging behaviour?
- Will an animal be more willing to expend effort and time for preferred foods?
- Will an animal accept greater risk of predation for preferred foods?
- In food-storing species, do cues of perishability affect food preferences?
- Do handling time and processing effort affect food preferences?

Suggested species:

Poecile carolinensis, Black-capped chickadees.

Sciurus canadensis, Grey and black squirrels.

Passer domesticus, house sparrow.

Branta canadensis, Canada goose.

Risk-taking as Social "Display" in *Homo sapiens*

There is very good evidence that the driver-mortality rate is higher for young men when there are passengers in the car than when not; there is no similar effect for young women or older people of either sex. There is also evidence that young men take more risks (e.g. speeding, driving through a yellow light) when driving if other young people are possible witnesses (e.g. observing the traffic from a sidewalk and as passengers). Observations of local driving practices or jay-walking or bicycling might be used to test hypotheses about risk-taking as social display, or other hypotheses may be addressed.

Altruism as Social "Display" in *Homo sapiens*

Why do people provide benefits to unrelated unacquainted persons who we are unlikely to ever see again? This has recently been the subject of much discussion in economics, anthropology, evolutionary biology and psychology. An obvious answer is that we were raised to be kind to other people and we feel good when we are able to help someone. However, this aspect of our sociality and our psychology would not have been selected for in ancestral environments unless, on average, the cost of providing benefits to others was offset by the fitness benefits. One possible kind of benefit derives from impressing others; women as potential mates and men as potential allies. Questions and hypotheses derived from these

considerations might be addressed by both correlational and experimental methods. (Please note, I veto the book-dropping methodology.)

Note: There are several other possibilities for studying people and other local animals; whatever the project the methodology must entail observational methods of naturally-occurring public behaviour.

Laboratory Projects

Shoaling in zebrafish (*Danio rerio*)

Zebrafish, like Canada geese, live in social groups; they are a shoaling species. Individuals prefer to join a group rather than be alone. Their shoaling behaviour and social preferences can be studied in relation to possible benefits and costs of group-living. The published literature and past studies of zebrafish by students in Psychology 3S3 have demonstrated that group size, the physical characteristics of the group, the complexity of the habitat, and overhead cover affect shoaling behaviour and preferences. There are many questions arising from these findings as well as questions about the effects of cues of predation risk and the quality and patchiness of the environment that can be pursued.

Sexual selection in Siamese Fighting Fish (*Betta splendens*)

Most people are familiar with this spectacularly-coloured aggressive species, but did you know that only males care for the young? Until very recently there were no studies of this animal in its natural environment. The field studies indicate that the males establish territories, and females visit males on their territories for spawning. There are many questions about male-male competition and female mate choice that could be pursued. Here are some to consider.

- Do *Betta splendens* males modulate their aggressive displays in response to information about their opponent's aggressiveness?
- Are *Betta splendens* females affected by the mate preferences of other females?
- What characteristics of the "territories" of *Betta splendens* males affect female preferences in a mate?
- Does the female's choice of mate depend on the choices available?

McMaster University Regulations for Use of Nonhuman Animals

The [regulations governing use of nonhuman animals](#) are intended to ensure the considerate and ethical treatment of animals. To this end, a number of policy requirements have been developed. These include approval by the McMaster University Ethics Committee of the care and procedures using nonhuman animals. In addition, students who will be using animals housed in approved animal facilities in the Psychology department will need the following:

1. WHMIS training (see <http://www.mcmaster.ca/riskmanagement/#WHMIS>)
2. Instruction arranged by your instructor and the McMaster University Central Animal Facility about ethical treatment of animals and security regulations.

Important Dates

September 10: first animal behaviour laboratory class

September 17: last day for drop and add

October 8: Thanksgiving holiday

November 2: last day for penalty-free drop

December 3: Last day of classes

Tentative Schedule

Dates	Project	Meeting	Agenda	Assignments
Sept 10	Intro	Class Rm 204	Overview of the course	
Sept 17	Project 1	Class	1 st Project: Vigilance in geese: Introduction to project	
Sept 24	Project 1	Class	1 st project: Vigilance in geese: data collection	
Oct 1	Project 1	KTH 121	1 st project: Vigilance in geese: data analysis (Note: meeting in computer room KTH 121)	
Oct 8	Thanksgiving holiday			
Oct 15	Project 2	Class	2 nd project: Chickadee foraging	Class Project 1 report due
Oct 22	Project 2	Class	2 nd project: Chickadee foraging (PC 403 computer room reserved)	
Oct 29	Group projects	Class	Planning group projects	Class project 2 report due
Nov 5	Group projects	Class	Research Plans	Research Talk (15- 20 mins). Research Proposal Due
Nov 12	Group projects	Groups	Data collection	
Nov 19	Group projects	Groups	Data collection (PC 403 computer room reserved)	
Nov 26	Group projects	Class	Mini-conference	Research Talk (15- 20 mins) of Group Project
Dec 3		No class		Paper of research project due

McMaster University Policy for Medicals and Deferred Exams

Please refer to the [Office of the Associate Dean of Science \(Studies\)](#) for important information regarding missed course work, medical exemptions (including the McMaster medical certificate), exam conflicts, and deferred exams.

Policy Reminder

Attention is drawn to the Statement on Academic Ethics and the Senate Resolutions on Academic Dishonesty as found in the Senate Policy Statements distributed at registration and available in the Senate Office. Any student who infringes one of these resolutions will be treated according to the published policy.

Academic Dishonesty: notice from Dean's Office

Academic dishonesty consists of misrepresentation by deception or by other fraudulent means and can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: "Grade of F assigned for academic dishonesty"), and/or suspension or expulsion from the university.

It is your responsibility to understand what constitutes academic dishonesty. For information on the various kinds of academic dishonesty please refer to the Academic Integrity Policy, specifically Appendix 3, located at <http://www.mcmaster.ca/univsec/policy/AcademicIntegrity.pdf>

The following illustrates two forms of academic dishonesty:

1. Plagiarism, e.g. the submission of work that is not one's own or for which other credit has not been obtained.
2. Improper collaboration in group work.

Message from the Chair of Psychology, Neuroscience & Behaviour

The instructor cannot be responsible for returning long distance calls from students. Any student wishing to reach an instructor is invited to e-mail the instructor.

Final Grade:

A+ 90-100%; A 85-89; A- 80-84; B+ 77-79; B 73-76; B- 70-72;
C+ 67-69; C 63-66; C- 60-62; D+ 57-59; D 53-56; D- 50-52; F 0-49%.

The instructor reserves the right to adjust final marks up or down, on an individual basis, in the light of special circumstances and/or the individual's total performance in the course. Furthermore, the instructor reserves the right to change the weight of any portion of this marking scheme. If changes in the marking scheme are made, your grade will be calculated using the original weightings and the new weightings, and you will be given the higher of the two grades. At the end of the course, the grades may be adjusted but this can only increase your grade and will be done uniformly. The instructor will use the grade equivalence chart of your calendar to convert between letter grades, grade points and percentages.

McMaster University Information & Contacts of Possible Interest

Centre for Leadership in Learning (CLL)

www.mcmaster.ca/cll

ext. 2450

Centre for Student Development (CSD)

<http://csd.mcmaster.ca>

ext 24711

Human Rights & Equity Services

<http://www.mcmaster.ca/hres>

ext 27581

Ombuds Office

<http://www.mcmaster.ca/ombuds>

Security Services

<http://www.mcmaster.ca/security>

ext. 24281

Student Affairs

<http://studentaffairs.mcmaster.ca>

ext. 27455

Academic Integrity Office

<http://www.mcmaster.ca/academicintegrity>

ext. 24303

Academic Skills Online

<http://csd.mcmaster.ca/writing>

Writing Skills

<http://csd.mcmaster.ca/writing>