Psychology 2002 course outlines for semester 2, 1998

Cognitive Processes

Learning and Behavioural Neuroscience

Psychological Statistics

Social Psychology
Pattern Recognition
The stimulus equivalence problem. Stages of pattern recognition: segmentation; feature extraction; classification and categorisation. Theories: template theory; feature theory; computational theory; connectionist theory.

Language
Comprehension and production. Models of word recognition.

Attention
Selective attention. Theories of attention: Multimode theory; resource allocation. Feature integration theory.

Memory
Short-term and working memory. The episodic/semantic distinction. Implicit and explicit memory. Reality monitoring and memory for source. Autobiographical memory. Semantic memory models and the representation of knowledge: Network models; feature comparison models; spreading activation; the ACT* model; distributed representations and connectionism.

Imagery
Theories: Dual coding; propositional encoding; multiple working memory systems. Imagery vividness. Experimental studies.

Reasoning
Deductive reasoning; syllogisms; errors in syllogistic reasoning; the Watson selection test. Inductive reasoning: adaptive heuristics; representative and availability heuristics; analogies; expertise.

Text
PSYC 2002 - Learning and Behavioural Neuroscience

Course notes

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Course Co-ordinator: Prof. R.A. Boakes, Griffith Taylor, Room 513
1. Syllabus

1. Conditioned taste aversion
2. General principles and animal models
3. Instrumental, including operant, conditioning
4. Partial reinforcement and extinction
5. Conditioned suppression and punishment
6. Avoidance
7. Spatial learning and memory
8. Complex learning and species differences
9. Neural basis of reinforcement
10. Reinforcing properties of addictive drugs
11. Neurochemical basis of anxiety
12. Effects of drugs on learning and memory
13. Olfactory learning and memory

2. Assessment

a) Practical Report

*Value*: Half of the marks for this module in Psychology 202.

The report is to be submitted at the end of Week 10. This consists of a 1000-word (strict limit) report on an experiment carried out in Weeks 3-9. This should take the form of a conventional report (see Section 3 below).

**Exemptions**

Students may apply in writing to the Course Co-ordinator, Prof. Boakes (GT 513), before the end of Week 2 in Semester 2 for an exemption from practicals which employ rats as subjects. They need to explain the ethical, religious or medical grounds on which the request is based. If an exemption is granted, alternative classwork to the practical report should be submitted (see below). Note that the exemption only covers the practical classes, not the entire tutorial/practical program. Attendance at tutorials is compulsory (see Section 6). Those with exemptions will be expected to study the practical notes and references.

Students with exemption will be required to submit an essay of 1000 words, in lieu of the report, and on the same date as the report is due. The essay topic is:

“A comparison between two procedures involving rats with respect to their validity as models of aspects of human behaviour”.

Students are expected to find their own references for this essay, as are those who do practical reports. The essay, as with the report, should be fully referenced and handed to your tutor.

The work for this alternative classwork is expected to be substantial, showing evidence of extensive library research, and at least comparable in time to that spent by other students in preparing for and attending practical classes.

**Plagiarism in Reports and Essays**

Please read the note on the Year 2 noticeboard relating to plagiarism. It is appreciated that a minimal amount of similarity will occur in reports because of the sharing of data. Students may also discuss their work. However, any similarity between reports beyond that which could arise from a discussion will be treated as plagiarism. Past instances include one student basing their report on that of another student or collaborative writing efforts.

b) Multiple-choice Exam  *Value*: Half of the marks for this module.

Half the multiple-choice questions will be based on material from lectures and assigned reading. The other half will be based on topics covered in the practical classes.
3. Form of practical reports

For detailed notes on writing a report, see the appropriate section of your Psychology 1 Handbook. The conventions used should be those recommended by the American Psychological Association which, with minor variations, are used by all main psychological journals. In brief, your report for the Learning component should contain the following sections:

Abstract: 100 words or less, summarising the entire report. It should be understandable without reading the rest of the report. The abstract is an abbreviated version of the report, not a promise of what will be done or said. The reader should be able to gain from it a general idea of a) what the point was; b) what was done; c) what happened; and d) what the results mean.

Introduction: A brief description of the general issues addressed by the experiment and review of the most relevant literature, leading to the specific aims or hypotheses of the study undertaken. Both relevant theory and research should be covered here.

Method: This should include subsections on: Subjects; Apparatus; Procedure. Sometimes additional subsections are appropriate, e.g. Materials, Statistical Analysis (when this is complicated or unusual).

Results: This section should provide a succinct description of the findings (i.e. standard English text) which includes a) a guide to any tables or figures (to help the reader find what is important in these); and b) the results of any statistical tests, and the nature of any significant difference or correlation obtained. Figures and tables should not be included without explicit reference to them in the text. This section should not contain raw data or statistical calculations. Do not display the same information in both a table and a figure. Decide which is the most appropriate format.

Discussion: Where there is a complex set of data, this may begin with a summary of the main findings. These should be discussed in the light of issues raised in the Introduction and also of theoretical considerations which may not have been raised earlier. The implications of the results for any hypotheses advanced are centrally relevant for the discussion. Consequences for the theories identified in the introductions are also relevant. Other points which can be appropriately discussed include possible methodological problems in the design of the experiment, and consistency with results from previously published research.

References: The report or the essay should be formally referenced. References may be obtained from library searches, tracing relevant references from the textbook and recommended readings, or using psychological abstracts. Do not rely on the textbook or recommended readings only. Only papers you have read should be cited in the list of references. (NB Occasionally it may be appropriate to use the form, 'Black, 1973; cited in Smith, 1995'), where the paper by Black could not be obtained, but Smith gives a good account of what Black had to say.)

Given that all this must be covered in 1,000 words, do not waste any.

3.1 Graphs

The data collection in the relevant practical should be graphed as part of the report. Brief notes on the basics of presenting data in graphs follow.

1. Plots of bar presses versus time do not start at the origin. You are recording the number of bar presses in 1 minute intervals, so there are no bar presses in the 0th minute, because you have not started counting them yet.
2. Points on the graph should be connected by **straight** lines.

3. Different procedures on the set of subjects require different graphs, or if plotted on the same graph, the last point in one procedure should **not** be connected to the first point in the next procedure.

   e.g. If you plot CRF and FR2 etc on the same graph, do not join the plots. Figure 1 gives an example.

4. Different groups of subjects on which the same procedure is performed require separate presentation on one graph. For deprivation levels to be compared, two points are drawn for each minute, as shown in Figure 2.

5. **Cumulative graphs do** start at the origin.

6. The graph should have a full title, and each axis should be named (see journal articles for examples).

7. Graphs should be computer generated, or on graph paper if hand drawn.

If you are in doubt about what should be included in the various sections examine a recent journal article in learning as a guide. *Quarterly Journal of Experimental Psychology, Section B; Animal Learning and Behaviour, Journal of Experimental Psychology: Animal Behaviour Processes and Learning and Motivation* are appropriate journals.

The word limit of 1,000 includes all of these sections (i.e. including the Abstract) except the References, Tables and Figures. The word limit should be strictly observed. Marks will be deducted for exceeding the word limit.
4. Textbooks and Reading

Main Texts


Other reading: (these may be useful in supplementing material in Mazur, especially when preparing the laboratory report.)


The main text, Mazur (1994), is an up-to-date book with a pragmatic approach to the subject. It is also used in Psychology 3. Schwartz and Hulse, Egeth & Deese are excellent supplements to Mazur. Domjan & Burkhard (2nd Ed., 1986) is more advanced, and is a good text for checking details.

5. Lecture Programme

Lecture 1: Taste aversion learning
Mazur (1994), pp. 61-62; Ch.9, esp.204-209; 220-222.

Lecture 2: General principles and animal models
Mazur (1994), Ch.1 (pp.1-17).

Lecture 3: Instrumental, including operant, conditioning
Mazur (1994), Ch.6, pp.113-131.

Lecture 4: Reinforcement schedules and extinction
Mazur (1994), Ch. 6, pp. 131-139.
For accounts of the Partial Reinforcement Extinction effect see Hulse, Egeth & Deese (1980) or Hulse, Deese & Egeth (1975).

Lecture 5: Conditioned suppression and punishment
Mazur (1994), Ch. 7, pp. 165-177.

Lecture 6: Avoidance
Mazur (1994), Ch.7, pp.151-165.

Lecture 7: Spatial learning and memory
Mazur (1994), Ch.6, pp. 253-266.

Lecture 8: Complex learning and species differences
Lecture 9: Neural basis of reinforcement

Lecture 10: Reinforcing effects of addictive drugs

Lecture 11: Neurochemical basis of anxiety

Lecture 12: Effects of drugs on learning and memory
Reading to be given in lecture.

Lecture 13: Olfactory learning and memory

6. TUTORIAL PROGRAMME

Attendance
Please note that attendance at tutorials is a requirement (see Section 2 above). Non-attendance could mean you are ineligible to pass Psychology 202. Make sure you sign the class list sheet circulated by your tutor. Practical reports submitted by students for whom there is no evidence of attendance at practical classes will not be accepted.

Venue
All meetings will be held in the Undergraduate Learning Laboratory in the South Badham Building, Room 163. Enter via South Badham courtyard (door opposite Badham Tutorial Room 5).

Overview of Programme

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<th>Week</th>
<th>Topic</th>
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<td>Video on taste aversion learning</td>
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<td>3</td>
<td>Habituation</td>
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<td>4</td>
<td>Magazine training and lever pressing</td>
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<td>Partial reinforcement</td>
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<td>Schedules of reinforcement</td>
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<td>Anxiety measured on the plus maze</td>
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<td>Working memory in the radial maze</td>
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<td>13</td>
<td>Video on neural basis of learning and memory</td>
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Aims
The aims of these practicals is to gain first hand experience in conducting experimental work involving animal behaviour which illustrates fundamental aspects of learning as well as behavioural measures used in neuroscience.
General Instructions for Practical Classes

Read the notes for each practical session before the laboratory session takes place. Students will be instructed in the operation of the apparatus by the tutor. In the event of the apparatus breaking down or requiring adjustment, this should be reported to the tutor.

Under no circumstances should the student adjust or attempt to repair the equipment. Check that it is working correctly before placing the rat in it.

Students will work in groups. By changing tasks from session to session each student should have the opportunity to handle their rats. In a given session those not directly participating by recording times or responses, or by handling the rat, should observe the behaviour of the rat, since the purpose of the exercises is to provide concrete experience of behavioural observations.

Successful training during each stage requires gentle and confident handling of the animals and care and patience by the experimenter. In particular, extraneous auditory, visual and olfactory stimuli should be reduced to a minimum when the animal is in the apparatus. Avoid making sudden sounds or movements. In most cases an immobile rat indicates a frightened animal and an unskilful experimenter. At the beginning of each session the rat is to be gentled by the E for a few minutes before the beginning of training. (This can be done while listening to the tutor's instruction.) It is particularly important to gentle the rat if the animal is naive or the E is inexperienced. Subjects are also less fearful if the general light level is kept low.

It is the policy of the Student Health Service to encourage students who have not already done so to guard themselves against tetanus infection, however remote the risk might be. Since any contact with animals increases the risk very slightly, students taking Psychology 2 are particularly advised to take advantage of the free injections offered by the Student Health Service. A booster shot is recommended two years after an initial injection and then every ten years. Students with asthma may be issued with masks if they require this.

Do not commence training during any session unless you are sure that you understand what you are required to do. You should read the requirements of the exercise, including the records to be taken before the session begins. Never leave the rat in the apparatus while you are checking what to do. The apparatus for sessions involving the bar pressing response is an operant conditioning unit consisting of a Skinner Box complete with bar mechanism and a water dipper. The apparatus is computer controlled. Instructions on use of the computers will be given in tutorials. Data collected by computer may be viewed and transcribed at the end of a session.

General points about the practicals
The main reasons for employing rats as subjects in psychological research is their convenience as experimental subjects, the extensive knowledge already available on their behaviour and physiology and the degree of control available over their current and previous environments and learning experience.

These practicals allow the development of understanding and critical appraisal of many basic behavioural phenomena. However, these ends are not attained merely by being present during practical sessions, or, for that matter, mechanically collecting data. Alert observation is required at all times. To assist you in this regard questions are given for each session. Thinking about the answers to these questions should help you to gain full advantage of the exercises.
Session 1 (Week 3): Habituation, including handling and marking.

NB Tutors to check that levers are removed from Skinner boxes for this session.

The purpose of this session is to provide a brief introduction of the students to rats and rats to students, and to handle the rats. It may be regarded as a practical on mutual desensitization for both rats and experimenters. In addition, data will be collected on habituation to the apparatus.

It is most important that the rats become used to being handled in a manner which reduces rather than increases their fear. The tutor will demonstrate handling. At the end of the session the rats will be marked for identification under the direction of the tutor.

After the rat has been gentled, it should be placed in the Skinner Box for a period of 12 minutes. Then, it should be handled again and returned to the Skinner Box for a second period of 12 minutes. During both 12-min periods its behaviour should be observed closely. In order to ensure that the observations made are as objective as possible, the procedures and definitions of behavioural categories described below should be followed very carefully:

- Take an observation on every 10th second (based on momentary observation, not an estimate of the average of the last 10 seconds) using the second hand or display of a watch.

- Two observers should record each rat simultaneously to check on reliability of observations (% agreement). The observers should not be able to see each other's records during this recording.

- Behaviour is categorized into one of the following mutually exclusive categories:

  A  Ambulation: moving around the floor, with or without sniffing.

  F  Freezing: no motion other than that necessary for breathing and not lying down, but supported by at least 3 legs.

  G  Grooming: scratching, rubbing, licking or stroking any part of itself, including its tail.

  R  Rearing: front two paws off the floor, but not grooming. (They may be touching the walls).

  S  Sleeping or complete rest: no motion, with or without eyes closed or partially closed. The main difference between this category and freezing is that in this case the rat is not standing on its paws, rather its body is resting at least partially on the floor.

  O  Other: any behaviour that does not fit the above 5 categories.

Freezing is typically taken as an index of fear or anxiety, which rats often exhibit in novel circumstances (neophobia). As the animal adapts to the handling and the apparatus we might expect less fear-related behaviours. Also 'exploratory behaviour' (A,R) should eventually habituate.
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Questions

1. How reliable were the observers?

2. Was there an effect of handling between Periods 1 and 2?

3. What change in behaviour best indicated a decrease in fear?

References

Mazur (1994), pp.45-51 (on habituation)

Graphs: The data should be appropriately plotted. Ensure that the axes are informatively labelled and that the figure is given a fully explanatory title.
Session 2 (Week 4): Magazine training and lever pressing.

Pt.1. Magazine Training

The purpose of this session is to train the animal to approach the dipper rapidly whenever it is raised and drink the sucrose solution from it. The E places the animal in the chamber following the standardised procedure to be used throughout this session and in subsequent laboratory sessions. This involves placing the rat on an area in the far right hand corner from the dipper with the rat facing the dipper.

The rat is given a total of 40 rewards in the chamber. If after 40 rewards E is satisfied that the rat is trained to approach and drink from the dipper, E asks the tutor to observe and confirm this during the period that the animal receives the next 10 rewards. If such confirmation is obtained, move on to Part 2, lever pressing. If not, additional time in the chamber will be given until satisfactory performance has been confirmed by the tutor.

In order to increase the chances of the rat obtaining the rewards the dipper time should be set to 20 sec initially, but is then reduced as the rat comes to approach the dipper more rapidly. The end point should be 3 sec. Judgement on the part of the experimenter is necessary here. If in doubt check with your tutor.

Questions

What stimulus serves as a cue for magazine approach?

What is actually learned by the rats in this session?

Reference

Hulse, Egert and Deese, 17-20, 27-30, 32, 36-37.

Pt.2. Shaping the lever-press response.

The aim is first to shape a lever (bar) pressing response, then to train the animal to press the lever with one dipper operation as reinforcement for each bar press (continuous reinforcement - CRF). When everything is ready and understood, place your rat in the chamber and leave him there for the rest of the session, unless some apparatus fault develops (e.g. jammed dipper) or something else goes seriously wrong.

The first stage is shaping the lever response. E reinforces successive approximations to a lever response. At first, anything resembling a lever response is reinforced. The E gradually becomes more strict in what is required as a response until the rat is pressing the lever with sufficient force to close the lever switch. The most common response will be to operate the lever with one or both forepaws. This stage ends when 40 rewards have been delivered, unless the rat is not pressing the lever adequately, in which case, further training is given. The computer records the number of bar presses and the number of dipper operations in each minute.

The second stage involves CRF training. The rat receives a reward following each lever press, drinks, operates the lever again, and so on. Record the number of responses made in each 1-min interval (see table). Draw one graph representing rate of responding for successive 1-min intervals. Then, to compare with a common form of graph used for free operant experiments, replot the same data on a graph that shows cumulative number of responses as a function of time.

Your records for this exercise are the score sheet and the two graphs, appropriately titled.
Note: If the response is not well established, arrange with your tutor a time for you to leave the rat in the box with the lever mechanism operating automatically for a long period when the lab is not in use; or to return during another time that week.

**CRF SCORE SHEET**

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Questions

In this session, which procedures are partly and which completely operant (instrumental) ones?

What are the potentially discriminable stimuli in this situation?

**References**

Mazur 122-125; Schwartz 27-32; 341-343; Hulse, Egeth and Deese 25-37; Mackintosh 143-148
Session 3 (Week 5): Partial Reinforcement of lever-pressing.

The aim is to train a rat, previously trained under CRF, to press the bar according to a fixed ratio schedule which is increased from reinforcement for every second press (FR2) to reinforcement for every fifth press (FR5). Training begins with 4 min of CRF, repeating the procedure employed in Session 2. If the rat is still responding slowly in the fourth minute (<5 rews/min), a further 3 min of CRF training are given.

The second stage is fixed ratio reinforcement. Throughout this practical record how many responses occur in each successive 1-min period. E gives at least 3 min of FR2, and more if necessary. Once responding regularly on FR2, the schedule is changed to FR5 for a further 3 min. This is then changed to FR5 for a further 12 min. E should ask the tutor to observe and confirm that satisfactory performance has been reached.

If time is available, training is continued on FR5 if performance is unsatisfactory or, if satisfactory, the schedule is switched to a variable-ratio, VR 6.

Questions

What is meant by 'straining' a ratio? What is its significance in applying operant conditioning procedures to human behaviour modification?

What could be examples of partial reinforcement schedules and increases in ratio of response to reinforcements in everyday situations?

References

Mazur 131-138; Hulse, Egeith and Deese 99-107; Schwartz, 298-309

PARTIAL REINFORCEMENT SCORE SHEET

<table>
<thead>
<tr>
<th>Minutes</th>
<th>Responses</th>
<th>Cum.Resp</th>
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<td>CRF: 1</td>
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Graphs
Record number of responses per 1-min interval and draw a graph representing rate of responding similar to that for the previous practical. Be sure to indicate the particular ratio of reinforcement on the abscissa of your graph and employ comparable units for the different ratios so that they may be compared. Cumulative frequencies for the different ratios are best compared by treating each as a separate curve in plotting each from the same point of origin and using the same axes.
Session 4 (Week 6): Schedules of reinforcement

The aim is to compare the lever pressing behaviour patterns produced by variable ratio (VR) and fixed ratio (FR) schedules of reinforcement. Half the rats in each tutorial group are assigned to one of two conditions: the FR and the VR groups. Assignment of rats to conditions will be done by the tutor (on a random or matched basis from the lever-press rate in the last practical).

Training begins with 5 minutes of FR3 and is followed by a further 15 minutes of FR3 in the fixed ratio condition, or 15 minutes of VR3 in the case of the variable ratio condition. The number of bar presses for each minute should be recorded.

The rat should not be removed from the apparatus between the two stages. The 20 minute procedure will leave time for:
- Comparison of the data collected under the two different conditions.
- Discussion of the pracs to date.

Questions

What difference exists between the procedures in terms of prediction of reinforcement?

What is the post-reinforcement pause? Under which schedules is it more likely to occur?

According to Capaldi’s theory which ratio (FR3 or VR3) should produce more resistance to extinction?

SCHEDULES OF REINFORCEMENT SCORE SHEET

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<th>Responses</th>
<th>Cum.Resp</th>
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Session 5 (Week 7): Extinction of lever-pressing.

The aim is to extinguish the bar pressing response, obtain spontaneous recovery and then conditioned reinforcement. Record number of responses in each 1-min period throughout. If your rat was not responding regularly on the FR 5 schedule introduced in the previous session, consult your tutor about extra training prior to the start of the procedure described below.

The rat first receives 5 min of FR5. The tutor will check this. Record the number of bar presses per 1 minute interval throughout the session. Proceeding without interruption the rat then receives 15 min of extinction; i.e. no reward occurs. Return the rat to its cage and, after an interval of 5 min, proceed to the next stage, consisting of a further 5-min period of extinction with conditions identical to those for the first extinction period. Spontaneous recovery will be shown by higher responding at the beginning of the second extinction period than at the end of the previous period.

When the second extinction period has been given, replace the rat in its home cage once more. The apparatus will be arranged so that the dipper operates, but produces no reward. When ready for this conditioned reinforcer phase, place the rat back in the chamber. Within a short time it should make a response and produce the dipper noise. Start timing a 5-min period from this point, recording number of responses per 1-min interval as before. If the rat fails to respond within 2 min of being placed in the chamber, operate the handswitch a few times - 3 dipper noises spaced about 5 sec apart - to produce the dipper noise without water delivery. Stop producing the noise after the first bar press occurs. If with this procedure the rat still does not respond, consult your tutor.

Note that in this phase instrumental reinforcement of lever-pressing by a conditioned (or 'secondary') reinforcer - the noise - is maintained in the absence of the unconditioned (or 'primary') reinforcer - the sucrose. However, during this period the effectiveness of the unconditioned reinforcer is likely to decline. Consequently you should expect to find both a) a high initial rate of responding compared to the preceding extinction period which reflects the effect of introducing the conditioned reinforcer; and b) a steady decline in responding as the effectiveness of the conditioned reinforcer decreases.

Questions

What therapeutic techniques could be based on partial reinforcement?

Why does removal of reward sometimes produce a temporary increase in rate of lever pressing?

Why does spontaneous recovery occur?

What is the difference between response reduction due to instrumental extinction i.e. removal of a response-reinforcer contingency, and that found in the final phase of this session?

How might one slow down the decline in effectiveness of a conditioned reinforcer?

In this particular case what effect might be expected from the noise of the dipper going down being the same as the noise of the dipper going up?

References

Mazur 128-130, 137-139.

Hulse, Egath and Deese 52-56, 107-121.

Graph:

Record the number of bar presses per 1 min interval and draw a graph of response rate. Draw separate cumulative frequency curves for each stage (i.e. same point of origin) using the same axes.

EXTINCTION SCORE SHEET

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Session 6 (Week 8): Discrimination training.

The aim of this practical is to bring the rat's lever pressing under the control of a discriminative stimulus (S+ or S-). A discriminative stimulus is one in the presence of which the response is reinforced. In the presence of the negative stimulus (S-) the response is not reinforced. We will use the light in the Skinner Box as the S+. The S- will be the absence of this light. The discrimination training phase is followed by a test phase.

The rat remains in the box continuously, receiving the following procedures:

1. Training:
   5 min of S+ (light) with CRF;
   5 min of S- (light off) extinction;
   3 min of S+, CRF;
   3 min of S-, extinction;
   3 min of S+, CRF;
   3 min of S-, extinction;
   2 min of S+, CRF;
   2 min of S-, extinction;

2. Testing:
   Disconnect dipper
   2 min (previous) S+
   2 min S-
   Repeat for total of 3 presentations of each stimulus

Repeat the last 4 min a further four times.
Record the number of bar presses per minute, for each minute of the S+ and S-.

Graph: Plot the rate of bar pressing per minute, with 2 separate lines (for the S+ and S-) using a common origin.

Questions

Why was the test phase necessary?

Does stimulus generalization affect the rate of discrimination learning?

What are examples of discrimination learning in everyday life?

References

Mazur 145-150; 171-177.

Schwartz, Chapter 8 (esp. pp.248-250)

Hulse, Egeth & Deese, Chapter 7 (Esp. pp.175-178)

Sessions 7-10 (Week 9-12): Instruction sheets for these practical sessions will be handed out later.
Psychology 2002 -
Psychological Statistics

Lecturer
Dr Margaret Charles
Room 635 Mungo Maccallum.

As in first semester, the course consists of a weekly lecture and tutorial. Assessment is made up of class mark (50%) and examination (50%). All tutorial tests are open-book in Semester 2, with one practice test, and then 2 assessable tests which contribute equally towards the class mark. As in first semester, a program will be distributed in the first lecture which details appropriate references to the text, further exercises which might be attempted, and the dates of the tutorial tests. The examination consists of multiple-choice questions.

In Semester 2 we build upon the groundwork laid in Semester 1. The topics for the semester fall into three broad categories: tests about systematic differences between means, correlation and regression, and tests about frequencies.

1. Tests about systematic differences between means:
Rather than a single mean, we consider cases where there is systematic variation in an independent variable of interest, and whether there is any evidence of a systematic difference between means. The rationale underlying t-tests for related samples and for independent samples is introduced. The use of confidence intervals for the mean difference is also relevant.

The F-test and the analysis of variance for testing hypotheses about the means of more than 2 groups is introduced. Extending the design of the experiment by including a second independent variable is also considered, with the use of multifactor analysis of variance and tests for main effects and interaction effects.

2. Correlation and regression:
Moving away from the experimental manipulation of variables, we also consider the discovery of relationships among naturally occurring variables. The meaning of a correlation coefficient, its calculation, tests for statistical significance and confidence intervals are worked through using knowledge of correlation between variables, we will also explore the areas of simple linear regression and prediction.

3. Tests about frequencies:
In addition to quantitative variables where differences in means are the primary concern, we will consider categorical data where it is primarily frequencies that are of interest. Tests for the goodness of fit to some hypothesised pattern of outcomes, and of the association or independence of categorical variables will be considered using the chi-square statistic.


For further reading and extra exercises:
Group and Intergroup Relationships

Intergroup processes
Relationships between groups; Prejudice, discrimination and intergroup conflict, examined from the theoretical perspectives of intergroup conflict, social learning theory, personality and psychodynamic approaches; eclectic theory.

Intragroup processes
Relationships within small groups, particularly factors influencing group performance (task and maintenance); Leadership and follower processes; group polarisation; social facilitation; deindividuation.

Interpersonal Processes

Altruism, helping behaviour and social support
Altruism distinguished from helping behaviour; theories of helping behaviour; bystander intervention in emergencies; determinants of helping behaviour; reactions of the recipients of help.

Affiliation and Attraction
Is there a need for affiliation? Why do we affiliate? Conditions under which our need to be with others is heightened. The nature of social support. Attraction: Measuring attraction. Some determinants of attraction; mere-exposure, proximity, similarity of attitudes, similarity of personality, level of esteem, mood state. The development of relationships: Theories of development. Reciprocity of exchange. The role of self disclosure.

Recommended references