Psychology experiment in laboratory class

Psychology, Psychotherapy

Laboratory Class Eight: Brain and Behavior 2: Basic Unromantic and Function. Laboratory Class Nine: Revision Laboratory. References & Inspirational Readings. All research or teaching using people at the University of Auckland requires approval of the University of Auckland Human Participants Ethics Committee. We have chosen the exercises carefully in order to provide you with what we hope will be an informativelearning experience. However, if you are uncomfortable with any exercises we strongly encourage you to contact your tutor and ask to be excused from participation.

It is much better if you are able to do this before the lab is underway. It is therefore recommended you read the manual to find out what is coming up before each lab and decide if you think any of the exercises may be distressing to you. If an exercise becomes distressing or uncomfortable for you during the lab, you are still able to be excused. Please be aware that you will only be excused from the specific exercise of concern, not the entire lab. Please also be aware that you will not be able to be excused from parts of a lab AFTER it has taken place on these grounds; you must see your tutor before or during the lab.

For Ethical concerns contact: The Chair, The University of Auckland Human Participants Ethics Committee, The University of Auckland, Private Bag 92019, Auckland. Tell: 373 7699 ext. 87830. Completing Laboratory Reports Introduction The laboratory reports for PSYCH 109 can count towards 20% of your final mark. Therefore, students are strongly advised to put significant effort into gaining good marks for their reports. When preparing reports, there are a number of things students should know. This section of the laboratory manual is written so that the appropriate information is available to all students.

The various areas ofpsychologytaught in PSYCH 109 have a long history of research. An essential component of scientificcommunicationis the requirement of conciseness and parsimony. This means that when communicating experimental outcomes and conclusions (such as from an international research project or an introductory level laboratory in psychology) it is very important to write in precise was observed, should be given. However, oversimplification is not an acceptable course of action. Explanations need to account for what was observed: no more, no less.

General considerations for Laboratory Reports ; Never exceed the page limit that is prescribed for an assignment, You will be able o answer questions adequately within the space limit. ; Ensure that you use appropriate grammar correct and spelling. Try to write clearly. Never assume that the marker knows what you mean. Remember that a marker can only evaluate what you have actually written - not what you meant to say in your answer. Plan how you are going to write your answers. Do not simply write the first thing that comes into your head.

Write a draft answer that you can edit and revise before writing your final answer. Try and use short sentences. Two short sentences are usually better than a long one. Ideas can be stated more concisely in shorter sentences. Often, long sentences end up being ambiguous. ; Remember to proof-read your work carefully before submitting your report. Sometimes it is a good idea to ask a friend who is not enrolled in 109 to proof-read your work and check for clarity. If this person does not understand your answer, it is likely that the marker will also struggle to follow it. If it is discovered that two or more Laboratory Reports are exactly the same, the concerned parties will be subject to disciplinary action. Plagiarism of any kind is not permitted. General requirements To help you write laboratory reports that will reward your effort with good marks, he following list of important points has been prepared. If you want to attain high marks you will need to incorporate the elements in this list into your written work for these papers. Constructing graphs experience of drawing graphs before and a few of you will have your own ideas of how a graph should be drawn.

These ideas may come from what you were taught at school or from the way you were instructed to draw graphs in other departments. Different scientific disciplines have their own codes of practice and communication. This is because the most concise mode of communication for one rear ofsciencemay not (and usually is not) the most concise mode for another area. Psychology is a science that follows the codes of practice and communication set down by the American Psychological Association (PAP), and the PAP has produced a set of guidelines for the presentation of graphs from psychological research.

According to PAP guidelines, there are strict rules for drawing graphs. In this Laboratory manual, however, when graphs are required, the emphasis will be more on how to interpret the graphs produced during the experiments. However, graphs must be legible and neat, and must follow the general guidelines below. General considerations for graph drawing Graphs should always be drawn within the space provided in the manual. It is a good idea to draw a preparatory graph on separate paper (graph paper will help you here) so that you can make a neat, correct copy in the space provided.

Graphs should be made as large as possible without causing cramping or squashing. All graphs should be drawn in pen (never pencil) and only one color is permitted -? preferably blue. All straight lines from which a graph is constructed must be drawn using a ruler. All errors need to be corrected either by redrawing the graph or, for a very small error, by neatly whiting out the error. Statistical Analysis in the Social Sciences Significant Differences In psychology, we are often faced with the question of whether or not the difference we see in two groups of data is statistically significant.

A significant difference observed in the data is one that is so large that it's unlikely to have occurred by chance alone. For example, we may be interested in knowing if students perform better in an examination under one condition than another - say, sitting an examination in a well-lit room as opposed too dimly-lit room. We could randomly mom, have them sit the examination in their allocated room, and then compare the two group's examination results. There will always be a difference between the groups' average results and there are two possible explanations for this difference: 1 .

Non-significant Difference The observed difference could solely be due to which students happened to be allocated to which room, I. E. , could be Just due to chance alone and nothing else. OR 2. Significant Difference The observed difference is sufficiently large that we simply don't believe that it's likely to have occurred by chance alone but that the level of lighting in the room is also avian an effect on each group's results, I. E. , this difference is so large that it is unlikely to occur when nothing else (apart from the 'chance' effect) is 'going on'.

Significance Tests and the p-value Sometimes the difference between two groups of data is really so large that, maybe with the aid of a plot, we can easily conclude that it is a significant difference. On most occasions though, it is not so clear cut and in order to objectively decide whether a difference is significant or non-significant we must perform a significance test. When we conduct a significance test, the most important value produced in the output is the p-value. The p-value is a probability, a value between O and 1, and it answers a question about the data: e. G. , " How likely is it, I. E. , what are the chances, I. . , what is the probability, that a difference this big, or bigger, would have been observed in the data if there really were nothing going on? " Interpreting the p-value Small p-values 0 a significant test result Large p-values 0 a non-significant test result If the p-value is small (less than 0. 05) then it is saying that less than 5% (0. 05) of the time (hardly ever) would we observe a difference(s) as big as this (or bigger) when toting apart from chance is contributing to it - it would be highly unlikely to get a difference(s) this big by chance alone. We say the observed difference is significant at the 5% level'.

There are a large number of significance (hypothesis) tests available to use depending on the situation under study but in this course we will look at only one test, the Independent samples t-test. (Non-assessed laboratory class).

Learning Objectives After completing this laboratory students should: 1. Understand the assessment requirements, requirements for pleasure, attendance acquirement, and assignment requirements for Psych 109. 2. Understand the hand-in dates for the two laboratory reports for Psych 109. 3. Understand the penalties for handing in late work; and the cut-off dates for accepting late assignments for Psych 109. . Understand where to hand in late laboratory reports for Psych 109. 5. Know the date and time of the terms test for Psych 109. 6. Understand what plagiarism is, and understand the consequences of plagiarism or other forms ofcheating. 7. Understand the correct procedure to follow for raising individual concerns or course criticisms regarding Psych 109. 8. Understand that a Psych 109 student must attend their scheduled laboratory stream in the weeks that laboratories are scheduled, and that they must ensure that their tutor correctly records their attendance at laboratories. 9.

Understand the procedure to follow if the scheduled Psych 109 lab cannot be attended. 10. Understand GAP requirements for undergraduate Psychology courses. Thinking. (Assessed laboratory classes). Lecturers: Associate Professor Tony Lambert (author of lab class). Associate Professor Doug Life (author of Research Methods lectures). After completing this laboratory students should 1. Understand the distinction between an independent groups research design and a repeated measures research design. 2. Be able to use a histogram in order to explore and evaluate the variability in set(s) of scores. . Be able to calculate the standard deviation of a set of scores using SPAS. 4. Be able to perform a t test in order to compare two experimental conditions. 5. Understand the statistical nature of inferences based on the outcome off t test. 6. Gain an appreciation of the complex issues that may be encountered in considering possible relationships between experimental evidence and theoretical conclusions. 7. Be able to think critically about the relationship between experimental evidence, psychological theory and everyday behavior.

Do men and women think differently? If so, to what extent and in what ways does the thinking of women differ from that of men? Judging from the enormous popularity of publications such as Men are from Mars, Women are from Venus; it seems that almost everyone has at least some interest in this question. In addition to popular publications of the Venus and Mars ilk, a substantial amount of serious science has been directed at answering this question. It will come as no surprise to discover that his work is controversial.

Controversy over research into sex differences in thinking is apparent at several levels. There has been disagreement concerning the reliability of the findings: Sex differences have been reported in a number of published studies, but not all these findings been replicated successfully by other researchers. Therefore, questions remain concerning the reliability of results in this area. In addition to the question of empirical reliability, there is the rather thornier question of what the experimental question. For example there is of course the perennial nature-nurture issue.

So if e find, for example, that men and women differ in their verbal and spatial skills, is this due to environmental factors arising from differentchildhoodexperiences and child-rearing practices for boys and girls;

or is it due to innate factors, related to biological and relatively immutable differences in brain structure and function for men and women? In addition to this rather baldly stated dichotomy between nature and nurture, a third state of affairs is possible - that both nature and nurture contribute, and that biological factors interact with learning and experience in complex ways during childhood.

One might also wish to consider the size of an experimental effect - although men and women may differ as a group on a particular cognitive task, there will also be considerable overlap in the scores. Clearly, the degree of overlap between the cognitive performance of men and women will have a bearing on the conclusions that can be drawn. The research findings of Hilary et al. (2005) Hilary et al. (2005; Behavioral Neuroscience, 1 19, 104-117) asked 42 men and 42 women to perform a variety of verbal and spatial tasks.

Blood samples were also taken, so that measures of circulating hormones, especially estrogen and storefront, could be measured. This was done because one aim of their study was to discover whether there is any relation between hormone levels and performance on cognitive tasks. There were three main findings: (1) Females performed better than males on a verbal fluency task; (2) Males performed better than females on a spatial task involving mental rotation; (3) There were no clear relationships between hormone levels and performance on any of the cognitive tasks.

In the laboratory exercise we will attempt to replicate the first two findings of Hilary et al. (2005). Obviously, it is impractical to look at their hormonal findings in PSYCH 109 - and even if we could, attempting to replicate their 'null result' may not tell us very much.) Our study, and that of Hilary et al. (2005) make use of an independent groups research design (also known as a between subjects research design). As you will remember from the recent Research Methods lectures, an independent groups (between subjects) design involves comparing different groups of individuals.

In this case, our independent variable (V) is sex , because the experiment involves comparing men and women withrespectto scores on verbal and spatial tasks. Other examples of independent groups designs might involve comparing extravert's with introverts (independent variable ispersonality), or five year olds with seven year olds (V) is age), or left hander's with right hander's (IV is handedness), or anxious with non- anxious individuals (IV isanxiety), and so on. An alternative, and equally popular approach is to use a repeated measures research design (also known as a within subjects research design).

In a repeated measures (within subjects) experiment the same individuals are tested repeatedly in two or more experimental conditions. An example of this kind of design could involve comparing the driving behavior (using a simulator!) of individuals before and after consuming varying amounts of alcohol (IV is alcohol dosage). Another example could involve asking individuals to employ and then comparing their performance under these different instructional conditions (IV is memory strategy).

Each kind of design (I. E. Repeated measures and independent groups) has advantages and disadvantages which render them useful for research in different kinds of situation. One advantage of the repeated measures sign is that it is often more sensitive than an independent groups design. This is because each person is being compared with themselves under different experimental conditions. A disadvantage of repeated measures designs is that the results can be contaminated by practice and/or fatigue effects.

A common strategy for eliminating or minimizing this problem is to counterbalance the order of performing in the different experimental conditions. For example, in the driving and alcohol example Just mentioned, half the participants might perform the driving task in the alcohol condition first followed (several days later! By the no alcohol condition; the other half would participate in the two experimental conditions in the reverse order. Independent groups is of course the appropriate design in any situation where the research question is related to individual differences, such as personality or handedness.

Independent groups designs are also often used in the clinical trials of medical researchers, where the effectiveness of one treatment is compared with that of another. Hence, our experiment will employ an independent groups research design with sex (female vs.. Male) as the independent variable. The experiment will have two pendent variables: scores on a verbal fluency task and scores on a mental rotation task. As you will remember from Research Methods lectures dependent variable(s) are the quantities or factors that are being assessed to see whether they might be related to (I. . Dependent upon) changes in the independent variable. How to carry out the experiment As mentioned earlier, our aim is to try and replicate the findings of Origin Hilary and her colleagues published in the Journal Behavioral

Neuroscience (Hilary et al. , 2005). To do this, each student participant will need to carry out a mental rotation task and verbal fluency task. All participants will perform the mental rotation task first followed by the verbal fluency task. Figure 1.

In the mental rotation task (see text) participants must decide whether pairs of shapes, such as those shown in A, B and C are identical or different. Mental rotation task Look at the top pair of pictures (A) shown in Figure 1. Are the shapes shown in the pictures exactly the same, or are they different? How did you arrive at your answer? Most people report that they solve this problem by imagining rotating the left hand shape clock-wise (or the right hand shape anti-clockwise), you ay be able to 'see' in your mind's eye, that the two shapes are exactly the same.

Now, decide whether the pairs shown in (B) and (C) are also the same. By using the same strategy, you might be able to 'see' that the shapes in B are also identical, but the shapes in C are different - and remain different, whichever way you rotate them in your imagination. The drawings shown in Figure 1 are similar to those used by Roger Sheppard and Jacqueline Metzger in a classic study published in the Journal Science in 1971. Sheppard and Metzger found that the time taken to make a decision in this mental taxation task increases systematically as the angular disparity between the two drawn objects increases.

These findings attracted great interest at the time, and continue to attract interest nearly four decades later. One reason for this enduring fascination is that Sheppard and Métier's findings showed that a mental phenomenon such imagination, which appears at first glance to be irredeemably private, subjective, and unobservable (by anyone else, aside from the person doing the imagining) can nevertheless be studied scientifically.

Furthermore, their findings showed that one aspect of imagination, the mental rotation process, appears to operate in a highly systematic and lawful way. In the version of the mental rotation task to be used for this laboratory exercise, you will be presented with pairs of line drawings representing AD shapes, and will be asked to decide whether the two shapes are the same or not. As in the examples shown in Figure 1, the shapes will be presented at varying orientations.

On trials where the correct response is 'different' the two shapes are usually mirror images of each other. These features of the task make it relatively difficult! Do not be concerned if you make errors when you carry out this task. The dependent variable or this part of our experiment is percent correct; clearly the experiment would fail if everyone was able to perform the task with 100% accuracy!