



Practical Investigations in the Psychology Laboratory

20 Empirical Activities for Psychology Students

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Introduction

The purpose of this support pack is to allow learners the chance to conduct laboratory experiments as part of their psychology study. It is suitable for formative assessment of SCQF level 7 Units in Research and Psychology. It aims to help the reader write up a notebook of laboratory experiments. This might end up with the learner writing a lab book that records the results of a series of their own psychology practical investigations.

First, realise that science is not hard, not elitist, not exclusive and is not closed to anyone. Science can be carried out by anyone as the methodology is available to all. The basis of empirical science starts from observing and counting the frequency of events or the magnitude of events. It involves measuring key variables and then making everyday observations and conclusions based on the recorded data. This can be done by anyone who sets their mind to science.

In social science, some of the experiments and study methods are repeatable by learners and can be tested and re-tested in educational laboratories around the world. This adds to the scientific claim of repeatability and strengthens the results of social science.

Here are a few experiments and practical exercises that allow learners to directly test hypotheses, reject null hypotheses and gather both quantitative and qualitative data. Their data can be stored in a science lab book — typically a hard backed lined jotter — and it may form part of their course assessment. They can test how robust some famous results are.

The hope is that learners will enjoy becoming a social scientist in the lab — perhaps wearing a lab coat and developing some of the observational skills and data handling capabilities necessary for today's social scientists.

Advice for Learners

Welcome! You might be trying these practical investigations to gain formative experience for a first year university course, or for an HN Psychology course. Please follow all the instructions from your centre about how to proceed safely with these practical investigations. These practical investigations are designed to be informative, interesting and of low potential risk. However, you are dealing with living participants with opinions, attitudes and beliefs. The practical investigations are labelled as to which part of Psychology the investigations are located. The topic is also listed to help make the links with other parts of your course.

Ethical Practice

Be careful! There are many ethical considerations to take into account before you should be allowed by anyone to do these activities. For example, there are the issues of confidentiality, competence, informed consent, the right to withdraw, protection from harm and debriefing to consider.

It is up to your centre to implement appropriate ethical procedures that ensure these ethical concerns are addressed. Under pressure, it is sometimes tempting to think these ethical procedures limit our freedom, but they are there for a reason — to enhance the experience for the participant and improve the quality of the results collected.

Measuring Variables

First, realise that social science is neither hard nor elitist; it is neither complex nor exclusive and is not closed to anyone. Social science can be carried out by anyone as the methodology is available to all. ‘There are no black swans’ might be the hypothesis, but if you find just one black swan, then that hypothesis of science must be rejected. In this simple way, observations advance social science.

The basis of empirical science starts from observing and counting the frequency of events or the magnitude of events. It involves measuring key variables and then making everyday observations and conclusions based on the recorded data. This can be done by anyone who sets their mind to social science.

Adding to the Repeatability of Science

In social science, some of the experiments and study methods are repeatable by learners and can be tested and re-tested in educational laboratories around the world. This adds to the scientific claim of repeatability and strengthens the results of social science.

Robust Science

Here are a few practical investigations that allow learners to directly test hypotheses, reject null hypotheses and gather both quantitative and qualitative data. Data can be stored in a science daybook or dedicated laboratory book.

Data Collection and Data Protection

Take great care in anonymising, but labelling and storing your data. There is a significant ethical concern here: no participant should be identifiable from any research you carry out. This needs to be highlighted as it is a significant ethic relating to **confidentiality** and **anonymity**. To repeat, no participant should be identifiable from any research. How can this be achieved? Remove all names from data and use labels such as 'Participant 1, 2, 3'. All data needs to be anonymised. Try to be aware of statutory data protection principles.

Advice for Tutors

Some people have good numeracy skills — others need more assistance. Perhaps have a small number of experienced researchers wear lab coats to act as ‘Demonstrators’. The Demonstrator’s role is to assist with measurement, tabulation and data collection.

It might also be advisable to encourage learners to read/study the BPS Ethical Guidelines before commencing any of the practical investigations. This can be obtained via:

http://www.bps.org.uk/system/files/Public%20files/bps_code_of_ethics_2009.pdf

You may instruct learners to work alone, in small groups, or as a whole class if it feels appropriate. However, all need supervision at key points in the research process to ensure ethical practice is carried out. Remember, there is the British Psychological Society (BPS) principle of shared responsibility for conduct.

Here are a few more of the main ethical principles from the BPS Code of Ethical Conduct:

- 1 Respect for the autonomy, privacy and dignity of individuals and communities
- 2 Scientific integrity and competence
- 3 Social responsibility
- 4 Maximising benefit and minimising harm

Collecting Data and Selecting a Sample

The class group can investigate and collect data as a whole group and some will be asked to consider becoming part of the sample to be investigated as their own participants. Other times, an opportunity sample from outside the group might be more appropriate. This will facilitate fast data collection.

Take care creating meaningful data tables — store the data next to the units being measured — and insist lab books are to be kept accurately. In a large group, have some appointed ‘Demonstrators’ (in lab coats). Demonstrators will help learners understand the instructions in the procedure and methodology.

Not all the practical investigations in the pack need to be carried out, for example, it could be that you choose a selection of around ten to be done. One practical investigation in a three hour class per week is realistic for a lab experience: one hour for practical materials preparation, one hour for data collection and one hour for analysis.

TIP:

It is good practice for social science learners to write **laboratory reports** according to a specific format which may be required for university, at conferences and in academic journals.

Lab book pro forma

Laboratory Report Book — How to Write Up a Social Science Practical

It is a good idea for learners to practice *writing-up* each practical in a short standard science report format. This is a revealing experience that helps develop communication skills for empirical research and can be done in a dedicated laboratory book. Often, social science lab books and journal papers follow a standard format that will be recognisable at university and across the world.

A typical science lab book format of headings might be:

- ◆ Title
- ◆ Research Question
- ◆ Introduction
- ◆ Hypotheses
- ◆ Method
- ◆ Results
- ◆ Discussion
- ◆ Conclusion
- ◆ References

TIP:

A lab book should be in a consistent, uniform style appropriate to empirical science.

The following page gives further advice about a typical social science report layout in the form of a standard pro forma.

Practical Investigation: (Specify the Number, eg 1)

Domain — learners should specify the area of psychology being investigated.

Topic Title — the title should be specific to the topic and the area of psychology being explored.

Research Question — establish the research question for the investigation.

Introduction — this should include some background to the study.

Aim — the aim should consistently begin with 'To

Hypotheses and identification of IV and DV — use these where the research is experimental.

Method — give a specification of the actual method used to gather data.

Design — specify the design used: this is most applicable if the research is experimental.

Sample — include the method of sampling, size and characteristics of sample, target population where appropriate.

Materials — all required materials including standardised instructions, debriefing, etc.

Procedure — details of how to carry out the research and ethics to be considered.

Results — results should be stated here and which hypothesis has been supported or refuted.

Data Analysis — description of the statistical techniques being used, along with visual display of data, etc.

Discussion — What do the results mean? How do these compare with existing theories, research, etc. What extraneous/confounding variables may have affected this research?

Implications

Learners could also be asked to explore the implications for contemporary psychology, which persons/groups might benefit from the particular research and to describe ways in which the research could be extended, eg investigate variations with age, gender, etc.

Conclusions

This section should have the conclusions based on the statistics calculated and the hypotheses set. It should also include an attempt to answer the research question.



Domain: Cognitive Psychology

Topic: Perception

Practical Investigation 1

Can the tactile senses discriminate psycho-physically between a one or two point touch?

Aim: To investigate and measure the difference between the sensitivity of the back of the leg to the sensitivity of the front of the leg.

Experimental Hypothesis: The front of the leg will be less sensitive than the back of the leg in two-point perception.

Null Hypothesis: There will be no difference between the sensitivity of the front of the leg and the back of the leg in two-point perception.

Method: Laboratory Experiment

Sample: One participant (using Repeated Measures)

Materials:

- ◆ 15 cm ruler (for measuring the two point separation)
- ◆ Two *blunt* pencils (or felt-tip pens with lids on are ideal)
- ◆ Blindfold (eg scarf)

Procedure:

- 1 Agree which two areas will be point tested (eg front of leg, back of leg).
- 2 Ask the participant to close their eyes or wear a blindfold.
- 3 On two different places, gently prod the leg area with either one or two points — in a point discrimination perception test.
- 4 Ask the participant: 'Is this two points or one?' Record if their answer is correct or not. (Correct/Not Correct).
- 5 For each area of the leg areas being tested, record the accuracy of each test result.
- 6 Count up the number of correct responses for each leg area. Then, calculate an overall 'percentage of accuracy' for each leg area tested.

Results:

Compare the percentage of correct responses for each area. For example:

IV = body area

DV = % correct discriminations

Leg Front	→	Correct, Incorrect, Correct, Correct, Correct ... = 80% Correct
Leg Back	→	Incorrect, Correct, Correct, Incorrect, Incorrect ... = 40% Correct

Now... Draw a graph: Pie Chart (Percentage Correct for each leg area)

Conclusion: Can the tactile senses discriminate psycho-physically between a one or two-point touch? Does the answer to this question depend on the area of the body tested?

Domain: Cognitive Psychology

Topic: Memory

Practical Investigation 2

Is there a difference in the ability to freely recall and remember organised words in a list from disorganised words?

Aim: To see whether the organisation of a list into categories improves the free recall for a list of 20 words.

Experimental Hypothesis: A semantically organised list of 20 words will be remembered better than a disorganised list of 20 words.

Null Hypothesis: There is no difference in recall for organised or disorganised word lists.

IV = type of word list (organised into categories/disorganised)

DV = number of words participants correctly recall (score out of 20)

Materials:

- ◆ Pens or pencils
- ◆ Two word lists
- ◆ Timer
- ◆ Sheets of blank paper for people to write their recall of 20 words

Design: Repeated Measures (ie one group of participants)

Sample: Around five people willing to take part in a short memory task

Method: Prepare a list of 20 unrelated words by writing these down in advance. This will be read to the sample group first. Then, write down a list of 20 related words — organised into fours around five related categories, eg four furniture words: chair, table, sofa, bookcase — four weather words: rain, snow, cloud, sunshine.

Results: Determine whether the number of words recalled for the disorganised list on average is less than the number of words recalled for the organised list. Draw and describe a graph of the averages.

Discussion: Why might Bartlett agree that schema categorisation is an important process in memory? Do the results support 'spreading activation' theory (a method for developing associations in the brain)?

Conclusion: Can you conclude that semantic organisation into categories improves recall accuracy from the memory of a 20 word list?

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Domain: Cognitive Psychology

Topic: Memory

Practical Investigation 3

Are pictures better recalled than words?

Aim: To investigate whether the recall capacity for pictures is greater than the recall capacity for words. In other words, the aim is to investigate whether pictures alone are recalled better than words alone.

Experimental Hypothesis: Pictures are more easily recalled from Short-term Memory (STM) than words alone.

Null Hypothesis: There is no difference in the capacity of memory for picture recall and word recall.

Method: 20 everyday words versus 20 everyday pictures (not the same lists).

Sample: five willing volunteers

Design: Repeated Measures

Materials:

- ◆ A list of 20 words (everyday concrete nouns)
- ◆ A set of 20 pictures (or for an interesting variation — 20 everyday objects in a box)

Procedure: *After gaining all the BPS ethical consents, follow this procedure:*

- 1 Firstly, explain the procedure and then present the words for a set time to the participants.
- 2 Ask the participants to recall as many words as they can from the 20 words.
- 3 Then, present the 20 pictures/objects for the same set time to the participants.
- 4 Ask the participants to recall as many words as they can from the 20 pictures/objects.

Results: Compare the average number of words recalled from the first list with the average number of words recalled from the second. Draw a graph.

Discussion: Is there evidence for a larger capacity visual memory than the traditional STM capacity of seven items plus or minus two? Explore the relevance of Paivio's (1971) 'dual coding hypothesis' to these results.

Conclusion: Can you conclude there was a difference in the capacity for recall shown between the two conditions? Are pictures better remembered than words alone?

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Domain: Cognitive Psychology

Topic: Self-concept

Practical Investigation 4

**Does a person's self-esteem improve after receiving a compliment?
'That jewellery is nice — fill in my questionnaire!'**

Aim: To see if compliments affect self-esteem.

Hypothesis: Self-esteem is improved by a compliment.

Null Hypothesis: Self-esteem is not improved by a compliment.

Materials:

- ◆ A short self-esteem survey (prepare a self-esteem questionnaire/Likert scale)
- ◆ A list of believable generalised compliments, eg ('Your shoes are really smart', 'Your hair is nice today.')

Sample:

- ◆ five people (with compliment — the experimental group)
- ◆ five people (without compliment — the control group)

Design: Independent Groups

Method: This is a field experiment with two conditions for the independent variable — interview method either *with* or *without* compliment. Ask an experimental group who get a compliment and compare the results with a control group who do not receive a compliment. The dependent variable is the resulting measure from a questionnaire to measure self-esteem (using a Likert scale).

Procedure:

- 1 Give a compliment to a small opportunity sample, then ask them to fill in a self-esteem scale.
- 2 Use another opportunity sample as the control group — ask the control group to fill in the same self-esteem scale.

Results: Comparison of averages between groups:

IV = received a compliment/control

DV = average self-esteem score

Without Compliment Group 1	Mean Self-esteem Score Group 1
With Compliment Group 2	Mean Self-esteem Score Group 2

Now... Draw a graph: Bar Chart — of the averages for both groups

Discussion: Do compliments have an influence on self-esteem? Olga Yatsenko (2013) at John Hopkins University has explored this topic. Are compliments always a positive experience? Can you conclude self-esteem is stable, like a trait, or flexible like a mood? Can self-worth be measured reliably?

Conclusion: Does a person's self-esteem improve after receiving a compliment?

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Domain: Social Psychology

Topic: Non-verbal Communication

Practical Investigation 5

Are yawns infectious?

Can a modelled yawn elicit a social yawn in a participant by triggering the fixed pattern of a yawn during a questionnaire interview?

Aim: Are individuals susceptible to social yawning (or contagious yawning)?

Hypothesis: Individuals are susceptible to social/contagious yawning.

Null Hypothesis: Individuals are not susceptible to social/contagious yawning.

Materials:

- ◆ a short but dull questionnaire
- ◆ an actor (who will model a yawn during the questionnaire)

Design: Independent Groups

Sample: Two groups of five participants

Method: Field experiment with two conditions

Procedure: **IV** = presence or absence of model actor yawn

DV = number of yawns observed during a questionnaire

- ◆ The role model will ask participants to fill in a questionnaire.
- ◆ The role model actor will mimic a yawning action on question five of the survey.
- ◆ Across the whole survey, the actor will observe the total frequency of yawning during the questionnaire.
- ◆ This frequency of participant yawning is the dependent variable for this demonstration.
- ◆ The mean frequency of yawning will be compared with a control group who do not have a yawning actor as a role model on question 5.

Results: Compare the average number of yawns per group. Produce a bar chart of the mean yawning frequency compared between the two groups of participants. Did the actor trigger any extra yawns in the participant? Did the number of yawns in the yawn-modelled group go up?

Discussion: Why do people yawn? There is no definitive answer to this yet. Recent theories are listed at this link:

<http://science.howstuffworks.com/life/inside-the-mind/human-brain/question5721.htm>

Are yawns communicable from one person to another?

Conclusion: Can a modelled yawn elicit a social yawn in a participant by triggering the fixed action pattern of a yawn during a questionnaire interview?

Domain: Learning Psychology/Biological Psychology

Topic: Behaviourism/Addiction

Practical Investigation 6

Can a target behaviour be elicited more frequently by using an external positive reinforcement in a variable ratio schedule?

Aim: The first aim is to see if a participant can learn a target behaviour quicker by applying external positive reinforcements. The second aim is to see the enhanced effects on learning of variable ratio reinforcement.

Experimental Hypothesis: Positive reinforcement by variable ratio schedule will be more likely to elicit a target behaviour in participants than when no reinforcements are applied or when a fixed ratio reward is applied.

Null Hypothesis: There will be no change in behaviour in response to a variable ratio schedule of positive reinforcement or a fixed ratio positive reinforcement schedule.

Materials:

- ◆ a variable ratio reinforcement chart for determining rewards to be given
- ◆ a set of tokens that can act as a point system in the lab
- ◆ a dice
- ◆ a timer, stopwatch or clock to time 15 second intervals over four minutes
- ◆ a set series of six behaviours in a list (eg clap, blink, nod, open mouth, touch nose)
- ◆ pictures of each of six behaviours next to each other in boxes for illustration

Design: Repeated Measures

Sample: One participant per demonstration

Method: Experiment within a one behaviour per 15 seconds game

Procedure:

IV = three conditions (no reinforcement schedule/fixed ratio reinforcement schedule/variable ratio reinforcement schedule)

DV = target behaviour (no of trials taken to elicit correct set series of six behaviours)

- ◆ The experimenter will ask participants to display a series of set behaviours in each trial attempt. The participant will be asked to guess the correct sequence of behaviours on each trial.
- ◆ Use a dice to decide the payout level for the variable ratio reinforcement being applied.
- ◆ Just before the experimental condition (IV = after) a reinforcement schedule will be used to determine the rewards given to the participant after each successful behaviour is expressed.
- ◆ The frequency of each behaviour will be recorded (DV) before application of the reinforcement schedule (this is Condition 1 of the IV) for five minutes and after application of the reinforcement schedule (this is Condition 2 of the IV) for four minutes.

Results: Compare the number of trials it takes for the set series of six behaviours to be learned. These can be compared against each other in a graph for the participant. Which condition of reward giving led to the most rapid learning of the set series of six behaviours? (Compare the number of trials taken for each reward pattern.)

Conclusion: Is the set series of behaviours acquired quicker with the application of a positive reinforcement? Are variable ratio reinforcements more effective at eliciting learning than fixed ratio reinforcements or no reinforcements?

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Domain: Social Psychology

Topic: Non-verbal Communication

Practical Investigation 7

Is there a gender difference in non-verbal communication in terms of the openness of the body language expressed?

Aim: This practical investigation aims to see if males' body language is more 'open' as part of their non-verbal communication than females who may be more 'closed' in their body language.

Experimental Hypothesis: Males will have a more open style of body language as part of their non-verbal communication.

Null Hypothesis: There is no gender difference in body language as part of non-verbal communication in terms of 'openness'.

Materials:

- ◆ A seated room full of people in a public area or classroom for field observation
- ◆ A simple observational checklist of open or closed body language components
- ◆ An overall recording sheet for counting either 'open' or 'closed' gender frequencies

Design: Independent Groups

Sample: An opportunity sample of a class or group in a public area.

Method: In a single time, a sample frequency of observed 'open participant' or 'closed participant' non-verbal behaviour.

Results: Determine whether each participant is either 'open' or 'closed' in terms of their current body language (this is the DV). Mark down their gender next to this judgement (this will act as the IV in this study).

Discussion: Are there mostly males in the group 'closed' or 'open'? What about the female participants? Which gender in the sample showed the most open body language as part of their non-verbal behaviour?

Conclusion: Can you conclude that males are more open than females in their body language? Why might males be more open in their body language than females? What impact might this have for such individuals in everyday life? How might this hinder certain applicants in job interviews?

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Domain: Cognitive Psychology

Topic: Memory

Practical Investigation 8

Is visual short-term memory better than verbal short-term memory in terms of capacity?

Aim: To investigate the free recall of **visual** versus **verbal** stimuli in a simple memory laboratory experiment.

Experimental Hypothesis: Visual recall from STM is better than verbal recall from STM.

Null Hypothesis: There is no difference between visual and verbal memory in terms of STM free recall.

Materials: 20 object picture cards, 20 object word cards; different objects for all lists

Design: Repeated Measures

Sample: Opportunity sample of around five people.

Method: Firstly, one participant observes the 20 flashcards of words only. Then, at the end of the 20 items, the participant will be asked to recall the items in the list freely and immediately. The participant then repeats the process, but with the 20 picture cards. (As this is like Practical Investigation 2, other independent variables may be added: such as taking a note of the participants' genders or ages to see if age or gender has an effect on visual versus verbal memory.)

Results: Compare the average word (verbal) recall rate versus the average picture (visual) recall rate for the participants.

Discussion: Is there any difference in the capacity for memory recall between words and pictures? Does this support Paivio's Dual Coding Hypothesis (1971)? Is there an interference effect due to order effects from the repeated measures design? Is this in line with Baddeley & Hitch Working Memory Model (1974)?

Conclusion: Can you conclude that visual memory has greater recall ability than verbal memory?

Domain: Developmental Psychology

Topic: Self-concept

Practical Investigation 9

Do individuals select similar aged role models to their own age?

Aim: This correlational analysis aims to see if there is a correlation between an individual's age and their chosen role model's age from a set of structured interviews.

Correlational Hypothesis: There will be a strong positive correlation between an individual's age and their chosen role model's age.

Null Hypothesis: No correlation exists between the age of a person and the age of their chosen role model's age.

Materials:

- ◆ A written but brief definition of 'a role model'
- ◆ A simple, quick, two-question structured interview:
 - Question 1 'If you don't object, could you state how old you are?'
 - Question 2 'If you don't mind, provide the name and age of one of your role models.'

Procedure:

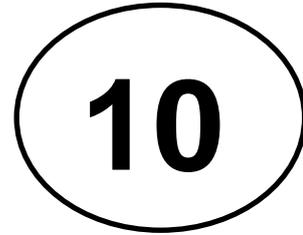
- 1 Ask each participant to write down their own age first (CoVar 1).
- 2 Then ask them to write down the name of an important role model in their life.
NB: They should be encouraged to write down the name of someone who you can work out the current age of.
- 3 Find out the age of the role model (CoVar 2).
- 4 Do this for a large sample (up to 20 people).
- 5 Record these two co-variables in a two column table in pairs.
- 6 Plot these two co-variables (CoVar 1 and CoVar 2) in a scatter graph.

Method: Correlational analysis of participants' ages and role models' ages. Can you conclude that the age of a person determines the age of their role model? Remember, this is just a correlational analysis and it cannot determine causation.

Results: Is there a positive correlation between a role model's age and the individual who selects the role model? Draw a scatter graph of the co-variables. It is also possible to calculate a correlation coefficient here.

Discussion: Erik Erikson suggested that identity formation occurs during adolescence and this is done during a crisis of 'role confusion'. Are role models predictably older than the individual who chooses the role model? Is it part of the definition of a role model? Additionally, what is the average age difference between the participants' and their chosen role models' ages?

Conclusion: Does the age of a person correlate with the age of one of their self-reported role models?



Domain: Cognitive Psychology

Topic: Perception

Practical Investigation 10

How does expectation form context affect the cognitive set employed during perception?

Can numbers be turned into letters by manipulating contextual expectations?

Aim: To see if a letter (B) can be perceived as (13) given a numerical context.

Hypothesis: Expectation from context will change the perceptual set of the same figure.

Null Hypothesis: Expectation from context will not change perceptual set of the same figure.

Materials:

- ◆ A copy of the stimulus above with the letter B or the number 13 on it
- ◆ Cover paper to mask and obscure the unwanted context
- ◆ Blank or lined paper for recording the results for each participant

Design: Independent Groups

Sample: Two groups of participants (eg 10 people and 10 people)

Method: Single Question Survey (Open Answer) 'What do you see?'

Participant Response: _____

Procedure: **IV** = *numerical* context versus *alphabet* context

DV = Categorical Participants' Responses

- ◆ For the first five people, the stimulus will be prepared to have only the numerical context visible (ie masked vertically with the horizontal letters on show).
- ◆ Ask participants the standardised question 'In the stimulus presented, what do you see?'
- ◆ For the second five people, the stimulus will be prepared to have only the alphabet context visible (ie masked horizontally with the vertical numbers on show).
- ◆ Ask participants the standardised question 'In the stimulus presented, what do you see?'

Results: Make a table of the results, being careful to categorise open answer questions (ie qualitative answers) into either *numerical* or *alphabetical* category (ie quantitative answers) answers. Compare the frequencies collected in a simple frequency bar graph to summarise the results.

Discussion: Try to describe what is happening in the perception of the figure. Can you explain why the context changing affects the interpretation of the figure? What other factors affect perceptual set? You might consider: emotion, culture and motivation. Websites that may prove helpful include:

- ◆ <http://www.simplypsychology.org/perceptual-set.html>
- ◆ <http://psychology.about.com/od/pindex/a/perceptual-set.htm>
- ◆ <http://www.markedbyteachers.com/university-degree/biological-sciences/an-investigation-into-perceptual-set.html>

Conclusion: Can you conclude that numbers can be turned into letters by manipulating the context? Does surrounding context affect direct perception?

Domain: Biological Psychology

Topic: Sleep and Dreams

Practical Investigation 11

Are you a lark — an early riser or an owl — a late sleeper?

Are there two types of people — late sleepers and early risers?

Aim: To see if there are two types of people with different sleeping patterns — early risers (larks) and late nighters (owls).

Hypothesis: Two distinct groups of sleepers should emerge: larks and owls.

Null Hypothesis: There is wide (and normal) variation in the sleep patterns of people with no distinct groupings.

Materials:

- ◆ A definition of a lark: an early riser from sleeping
- ◆ A definition of an owl: a late sleeper
- ◆ Paper to construct a short and simple 'Lark or Owl' Likert scale
- ◆ A frequency table — for record keeping of people's 'Lark or Owl' scores

Design: Construction of a Frequency Polygon from a Likert scale score

Sample: A set of Likert scale survey respondents (eg 20 people)

Method: A 'lark' could be described as a person who rises early, feels at their best in the morning and needs to go to bed early, compared to an owl who rises later in the morning, feels at their best later in the day and does not retire to bed until later in the evening. Larks are today described as 'phase advanced circadian sleepers'. Owls are described as 'phase delayed circadian sleepers'.

Create a short Likert scale questionnaire to measure a 'Lark or Owl Score' with statements like:

'I sleep late in the morning.'

Agree 1..2..3...4 Disagree

'I wish I could spend more daytime in bed.'

Agree 1..2..3...4 Disagree

Procedure: From the Likert scale survey, give each participant a 'Lark or Owl Score' to indicate how strongly Larkish their sleeping habits are. There is only one variable to measure here: Variable = Larkishness or Owliness (ie type of sleeper) as measured by their 'Lark or Owl' Score.

Results: When totalled up, how do the 'Lark or Owl' scores vary? Are some participants high scoring and some participants low scoring? How are the participants' scores distributed in terms of their frequency of occurring? Using a frequency polygon (a line graph of the frequency of scores), to determine whether there is just one group of average sleepers. It might be there are two distinct groups: ie Larks measuring 'High Lark Score' and Owls measuring 'Low Lark Score'.

Discussion: Try to describe what is happening in the frequency histogram. Is there evidence for larks and owls being two distinct types? Which hypothesis gains most support from the frequency table? You might like to explore reasons that determine whether an individual is a lark or an owl. What are the benefits/disadvantages of each type of sleeper? Also, recent research from the website below has highlighted two new types of sleeper:

<http://digest.bps.org.uk/2014/11/youve-heard-of-owls-and-larks-now-sleep.html>

Conclusion: Can you conclude that there are two types of people in terms of sleep pattern — early risers (larks) and late nighters (owls)?

Domain: Cognitive Psychology

Topic: Sleep and Dreams

Practical Investigation 12

How do sleep hours vary with age? Does ageing shorten sleep? Do older people need less sleep?

Aim: To investigate the correlation between age and sleep hours. This is an investigation which looks at the possible association between the amount of sleep time taken and the age of the person.

Hypothesis: As age progresses, the length of time spent sleeping decreases (ie there is a negative correlation between age and length of time spent sleeping at night).

Null Hypothesis: There is zero correlation between age and the length of time spent sleeping at night.

Materials:

- ◆ A short questionnaire on **sleep** with two main quantitative questions:
 - Question 1: 'What age are you (in years)?'
 - Question 2: 'How many hours sleep do you typically experience at night (in hours)?'

Design: Correlational Analysis

Sample: A sample of 10 or more people of mixed ages — some old and some younger, but all over 16 years of age.

Method: Two Question Survey (Closed Answer, Quantitative)

Procedure:

Co-variable 1 = age (in whole years); as self-reported by the participant from the survey.

Co-variable 2 = time spent sleeping at night (in whole hours) of sleep; as self-reported in the survey.

For each participant, use the answers to the two question survey to measure Variable 1 and Variable 2 to create a pair of co-variables for each participant. Plot each co-variable pairing in a scatter graph. So, each participant will represent one point on the scatter plot. This should reveal if there is a negative correlation between age and the length of sleep at night or not.

Results: Firstly, make a table of the data pairings, for each participant. Make sure you have the age of the participant and the hours of sleep paired together for each participant like (X,Y) co-ordinates on a graph. In your scatter graph, plot the age variable as the x-axis and the hours sleeping as the y-axis.

Discussion: Try to describe what is happening in the scatter graph. Is there a trend upwards or downwards? Is there enough variation in your sample to spot a trend upwards or downwards? Is your sample big enough? (It might be appropriate for advanced numerate learners to calculate a correlation co-efficient here, using either Spearman's rank *Rho* method or by Pearson's parametric test of correlation significance). You might like to investigate reasons for the differences in sleep patterns and age and explore different types of sleep that different ages require.

Conclusion: Can you conclude there is a negative correlation between the age of a person and the amount of time they spend asleep at night?

Domain: Biological Psychology**Topic: Stress****Practical Investigation 13****Do heart rate and self-reported stress levels correlate?****Is the self-reported stress level of a participant correlated with their heart rate?**

Aim: This is a calibration exercise and not an experiment. The aim is to see if heart rate and self-reported stress levels positively correlate. The results of a questionnaire on today's hassles (ie stressful events) will correlate positively with observed and measured heart rates (a biological indicator of stress).

Hypothesis: The heart rate will positively correlate with the daily hassles questionnaire score.

Null Hypothesis The heart rate will not correlate with the daily hassles questionnaire score.

Materials:

- ◆ A stopwatch, pen and paper
- ◆ Heart rate monitor or the ability to take a pulse (heart rate in beats per minute)
- ◆ Paper to design a questionnaire of daily hassles

Design: Correlational Design

Sample: Approximately 10 people

Method: Questionnaire and observation of a Biological Metric Indicator (Heart Rate). Before starting this correlational analysis, construct a 'tick sheet' list of daily hassles that people generally find stressful in everyday life. (Consider that DeLongis found hassles correlated with stress related illness and Kanner found daily hassles predict stress levels better than Holmes and Rahe's major life changes). If the list has 20 hassles, then participants will get a daily hassles **score out of 20**.

Procedure: **Variable 1** = *Heart Rate* (in beats per minute)

Variable 2 = Daily **Hassles Score** (out of 20 Hassles)

- ◆ Firstly, ask the participant for a pulse reading — write down the **rate of their pulse** in beats per minute. This is **Variable 1** — it can (possibly) be thought of as an internal bodily indicator of stress levels — a biometric variable that may correlate with stress.
- ◆ Secondly, ask the participant to complete the questionnaire (they should tick a list of daily hassles) that they have recently experienced (eg today). If the list has 20 hassles, they will get a hassles **score out of 20**. This will be **Variable 2** — a hassles score calculated by counting the ticks on the hassle list — out of a possible twenty ticks.

Results: Make a table of the results, being careful to pair the data for each participant. Be careful to anonymise the results as 'Participant 1 (Var1, Var2)'. Make sure the data is the right way around and clearly labelled. Use each pair of results to construct a scatter graph.

Discussion: Heart rate is a well-known (weak) biometric indicator of stress. Lazarus and Kanner also listed evidence that 'daily hassles' are a good indicator of stress levels. If both these variables are indicators of stress levels, then they should positively correlate.

Conclusion: Can you conclude that there is a positive correlation between daily hassles and heart rate?

Domain: Social Psychology

Topic: The Anchoring Bias versus Conformity

Practical Investigation 14

How does conformity and anchoring affect social judgements?

Can anchor numbers act to anchor both individual and social judgements?

Aim: To see if a number can act as an anchor in both an individual setting and in social judgements.

Hypothesis: An anchor number will be effective in influencing both an individual estimate and socially made estimates.

Null Hypothesis: The anchor number will not affect either individual or social estimates.

Materials:

- ◆ A jar of beans, pasta or buttons.
- ◆ A large 'anchor' number on a large label attached to the jar, eg
- ◆ Blank estimate sheets/Pre-filled in estimate sheets

Design: Independent Groups design; three groups, ie one control group, two experimental

Sample: Three groups of six people

'Method: Single Question Survey (Quantitative Answer) "How many beans are in the jar?"

Participant Response: Enter the number here...

Procedure:

IV = *context*: no anchor/anchor in an individual setting/anchor in a social setting

DV = size of estimate number (ie level of average estimate)

- ◆ Ask participants the standardised question 'In the jar, how many beans are there?'
- ◆ Make sure the participant gets a chance to view the jar, the appropriate estimate sheet and the 'anchor' label, if present.
- ◆ Record their estimate on a blank estimate sheet.

Results: Make a table of the results and then a bar chart, being careful to record each estimate under the correct condition of the experiment. There are three conditions of the experiment: just the jar, the jar plus the anchor label, and thirdly, the jar, the anchor label and the social estimates.

Discussion: Try to describe what is happening in each of the three conditions above. Why did you get the estimates you did? Tversky and Kahneman (1974) proposed an ***anchoring bias*** during judgements under uncertainty and it is suggested that anchoring occurs most strongly in a situation of ambiguity when there is little other information to go on. Asch (1951, 1955) suggests individual and social processes moderate the initial judgement via social pressure to conform. Could you suggest further comparison conditions to add to this experiment to make it better?

Conclusion: Do anchor numbers have an effect on individual judgements? Does the anchoring bias have more effect than the social conformity bias? Further research may be required here!

Domain: Psychoanalytic Psychology

Topic: Sleep

Practical Investigation 15

Can memory of a clear and lucid dream be elicited and then recorded into a case-study description?

Can you elicit the memory of a dream and write it up as a case-study?

This is what Freud became famous for, so it is good to try out his own method first hand. The aim of this investigation is to reflect on the case-study method as a primary source.

Aim: To see if it is possible to write a dream account as a case-study.

Hypothesis: A dream can be clearly recalled and written into text in a case-study description.

Null Hypothesis: All dreams are quickly forgotten and dream analysis is meaningless.

Materials:

- ◆ Blank paper to write a case history — this could be the start of a SLOG (a Sleep Log)
- ◆ Time to write the dream account — half an hour

Design: Case Study Qualitative Description. The dream account could be elicited by self-reporting or elicited by a ‘therapist style note-taking’ session. The dream could be elicited during an interview between ‘client-interviewer’ pairs. If so, the method becomes a face to face clinical interview between participant and researcher.

Sample: Convenience sample of **one** participant (ie one single case-study). The data for this investigation is to be a textual description of one single dream account. This could be written before or during this investigation. It could be written by self-report or by the interviewer.

Method: Case Study: A qualitative (textual) account of one dream. If the investigation is to use a dream elicited in class, it might be appropriate to use a partner to employ the cognitive interview technique to snowball the case-study memories for one particular dream. If so, focus in on one or more memories, change the point of view, change the order of telling and reinstate some of the feelings had during the dream.

Procedure: Write down **every** memory you can recall from one dream. As you write, bear in mind, a psychoanalytic psychologist might interpret the manifest content as symbolic of subconscious conflict. Alternatively, a cognitive psychologist might interpret your dream story to be just random neural firing spun together into the most plausibly conscious storyline. Afterward, look up Freud's interpretation of symbolic dream content to see if your manifest dream represents anything like subconscious wish-fulfilment.

Results: Write at least 500 words of qualitative text in a clear and lucid story. This is your dream case-study account. To compare it to one of Freud's dream accounts, consider his patient 'Dora' or 'Anna O'.

Discussion: Try to describe what the dream feels like at the time. Is it helpful or annoying? Should we encourage people to keep a dream log? What benefit would a 'Sleep Log' perform?

How reliable is the case-study method? How valid is the method as a source of data? Can you generalise anything from one single case study?

Conclusion: Can you conclude that a dream can be recalled and interpreted? Does the content reveal any symbolic wish-fulfilment?

Domain: Biological Psychology

Topic: Stress and Relaxation; Physiological Stress Management

Practical Investigation 16

Which physiological stress reduction technique works the best?

Can physiological stress reduction techniques be objectively evaluated by a simple biological metric — the heart rate?

Aim: To discover a stress reduction (ie relaxation) technique that works to lower the heart rate. To measure the effectiveness of a stress reduction technique by observing a quantitative measure (the heart rate of the participant).

Hypothesis: There will be a method of relaxation that lowers the heart rate more than other relaxation techniques.

Null Hypothesis: There will be no difference in relaxation techniques at lowering the heart rate.

Materials:

- ◆ Heart rate measurement equipment for taking heart rates before and after the relaxation therapy
- ◆ Access to a relaxation method (eg 10 minutes relaxing music, yoga, meditation, massage)

Design: Independent Groups

Sample: Four participants experiencing four different types of relaxation therapy with heart rates monitored.

Method: Lab Experiment — Design — independent one person sample per method

Procedure:

IV = *type of relaxation* therapy (eg yoga, music, meditation, massage)

DV = Change in Heart Rate (between Before the Therapy and After Therapy)

- ◆ Measure the participant's heart rate before applying any relaxation therapy
- ◆ Allow the participant to undergo the chosen relaxation procedure (eg yoga, music, meditation, massage) for 10 minutes. There should be no other stressful distractions, ie it should be carried out in a safe, controlled setting.
- ◆ After the 10 minutes relaxation therapy, ask the participant to measure their heart rate once more.

Results: Make a table of the heart rate results for each person from BEFORE and AFTER the therapy. This is a classic before and after design. Keep a note of the relaxation therapies employed. Then, calculate the change in heart rate between the measure taken before and the measure taken after (ie subtract the AFTER heart rate from the BEFORE heart rate).

Discussion: Present the results in a **table** find the most effective relaxation technique. Find which technique reduced the heart rate the most. If an elevated heart rate indicates a high stress level, does a lowering of the heart rate always indicate relaxation?

Conclusion: Can you conclude from this study that the relaxation therapy tested above which produces the biggest reduction in heart rate, is the most effective relaxation technique? Can you compare physiological techniques with psychological techniques of stress reduction?

Domain: Social Psychology

Topic: Interpersonal Attraction

Practical Investigation 17

How does the 'halo effect' affect criminal justice sentencing?

Can the halo effect (Thorndike, 1920) be used to avoid a long sentence in court?

Aim: To see if an attractive photograph of a face can induce a halo effect and reduce the average sentence issued for a set crime. The aim is to see if criminal sentencing is affected by the halo effect.

Hypothesis: Individuals will be influenced by the halo effect and this will change the average level of sentence issued in a fictional criminal justice case.

Null Hypothesis: Individuals will not be influenced by the halo effect and an attractive face will not influence the average level of sentence issued in a fictional criminal justice case.

Materials:

- ◆ A fictional written case history of an unknown crime and an unknown criminal.
- ◆ Two portrait face photographs — one an agreed attractive face, one agreed average face.
- ◆ A physical line — to mark the length of sentence to be chosen.
- ◆ Two copies of the case history above — for standardisation.

Design: Independent Groups

Sample: Two small groups of participants (eg five people and five people)

Method: Questionnaire — Two conditions, two stimuli (attractive face, average face)

Questionnaire: For how long should this criminal be sentenced?
(Circle your answer):

1 year 2 years 3 years 4 years 5 years 6 years 7 years 8 years 9 years 10 years

IV = attractiveness of face of the criminal: (two conditions: attractive face (1), plain face (2))

DV = Length of Sentence — as suggested by the tick on the line in the Participant's Response

Procedure:

- ◆ With two independent groups of people, ask each participant alone the standardised question 'For how long should this criminal be sentenced?'
- ◆ Make sure the first group of people sees only the attractive photograph of the criminal.
- ◆ Make sure the second group sees only the plain or average looking photograph of the criminal.

Results: Compare the average length of sentence prescribed (in years) between the two groups. From the raw data, construct a summary statistical data table for the two groups. Make a graph of the results.

Discussion: Is the attractive face influencing the length of the sentence? In which direction? If the crime is theft, attractiveness may reduce the sentence, if the crime is fraud, the attractiveness may increase the length of sentence. Was your study non-gender specific?

Conclusion: Can you conclude that facial attractiveness influences the length of sentencing in the criminal justice system?

Domain: Cognitive/Psychoanalytic Psychology

Topic: Memory and Repression

Practical Investigation 18

Are unpleasant words remembered less well than pleasant words?

Can memory recall for words be affected by the pleasantness of the words?

Aim: To investigate whether unpleasant words are repressed more than very pleasant words.

Hypothesis: Unpleasant words are recalled from memory less easily than pleasant words.

Null Hypothesis: The pleasantness of words will not affect their recall from memory.

Materials:

- ◆ A list of 20 very pleasant words (eg chocolate, hug, smile, flower, tea)
- ◆ A list of 20 very unpleasant words (eg shock, breakage, coma, attack)
- ◆ Blank or lined paper for recording the results for each participant

Design: Repeated Measures — where one participant takes part in both IV conditions.

Sample: A small group of participants (eg five to 10 people)

Method: A lab experiment with repeated measures; one group measured twice with two conditions.

Procedure:

IV = two conditions (pleasant word list versus unpleasant word list)

DV = level of memory recall (accuracy of recall of list out of 20 items)

- ◆ For the first condition, read the list of 20 pleasant words.
- ◆ Ask all the participants to write down as many words as they can remember from the pleasant word list.
- ◆ For the second condition, read out the list of 20 unpleasant words.
- ◆ Then, ask all the (same) participants to write down as many words as they can remember from the unpleasant word list.

Results: Make a table of the results for the first condition and then for the second condition. Keep the data from each participant together, but anonymise the data before discussing any trends. Present the data in a bar chart that graphs the average recall for the group for pleasant words and then for unpleasant words. Is there a clear difference — or just a marginal difference?

Discussion: Was Freud right in assuming the mind is resistant to recalling unpleasant events? Do subconscious processes of neurosis and anxiety enter everyday memory as Freud claimed? How does your evidence compare with Levinger & Clark's support for repression in memory?

Conclusion: Can you conclude that unpleasant words are repressed more than pleasant words?

Domain: Cognitive Psychology

Topic: Attention

Practical Investigation 19

Does ingestion of coffee, water or sugar affect reaction times?

Can your reaction time be improved after ingesting coffee, water or sugar?

Aim: To see if an individual's reaction times alter after ingesting coffee, water or sugar.

Hypothesis: Ingestion of coffee, water or sugar will increase reaction time in a participant. Reaction times after ingestion of coffee, water or sugar will be shorter than before.

Null Hypothesis: There will be no difference in the average reaction time after ingesting coffee, water or sugar.

Materials:

- ◆ A stopwatch (either a real one or as an online stopwatch or phone app)
- ◆ Coffee, water or sugar to ingest — an everyday amount of coffee, water or sugar
- ◆ A table to record multiple participant reaction time measurements
- ◆ Materials to clarify how the reaction times would be measured, eg speed of completion of a cognitive test. Could use the website:
www.humanbenchmark.com

Design: Repeated Measures

Sample: A small group of participants (eg seven people)

Method: Laboratory Experiment

Procedure:

IV = *Before Condition (no ingestion) versus After Condition (with ingestion)*

DV = Average (or median) reaction time for each participant

- ◆ Before allowing the participant to consume the coffee, water or sugar, first ask the participant to take five reaction time measurements.
- ◆ Calculate the average (mean or median) reaction time for this set of results.
- ◆ Then, allow the participant to consume the ingestion. Say 'You may now ingest.'
- ◆ Wait five minutes
- ◆ After allowing the participant to consume the ingestion and waiting five minutes, ask for another five reaction time measurements to be taken. Calculate the average reaction time after the ingestion.
- ◆ Thank the participants.

Results: Make a table of the results. Is there a clear difference in the average reaction times? What about the median? Is the substance being ingested in this trial truly affecting reaction times — or is some other order effect at work? Is your sample of reaction time measurements reliable? How representative of the wider population is this sample of results?

Discussion: What other factors affect reaction times? Could this be run again with a completely blank control condition, where nothing is ingested? How would this compare? Do you still trust the claims made on the side of energy drinks and other reviving products? How do sweets affect children's concentration, behaviour, etc?

Conclusion: Can you conclude that reaction times can be improved after ingesting coffee, water or sugar?

Domain: Cognitive Psychology

Topic: Gender

Practical Investigation 20

Does gender affect empathy expression in a survey?

Do females and males differ in their expressed empathy?

Aim: To see if females and males differ in their skills in empathy expression in a survey.

Hypothesis: Gender will affect empathy levels as measured by an empathy survey.

Null Hypothesis: Gender will have no relationship with empathy levels as measured by an empathy survey.

Materials:

- ◆ An empathy assessment questionnaire
- ◆ A record sheet to record the socially expressed gender of the participant
- ◆ Pencils and paper

Design: Questionnaire with two sample groups: males and females.

Sample: A quota sample of **five** males and **five** females.

Method: Face to Face; Questionnaire; non-experimental analysis by gender.

Make a Likert scale survey up from scratch that gives participants a score that represents their level of empathy expression.

It might have statements such as:

'I can cry in public.' 1 Strongly Agree 2 Agree 3 Disagree 4 Strongly Disagree

'I yell for joy, often.' 1 Strongly Agree 2 Agree 3 Disagree 4 Strongly Disagree

'When I hurt someone, I feel it.' 1 Strongly Agree 2 Agree 3 Disagree 4 Strongly Disagree

Procedure:

IV = gender (male, female)

DV = Level of empathy expressed in the Likert scale survey

- ◆ Ask participants to note down their gender on the questionnaire, if they wish to
- ◆ Then, ask them to complete the questionnaire on their 'empathy expression'
- ◆ Calculate an empathy score for each participant and then calculate an average for males and an average for females

Results: Make a table of the average empathy level for each gender group. Compare the averages for males and females. Use a bar graph to show the results.

Discussion: Try to describe the reasons for any difference, if there is one. Did you find a difference? Explore the reasons why there may be a gender difference in expressed empathy — or why not, nowadays?

Conclusion: Can you conclude that **gender** influences the level of empathy expression?