

1 A quick guide to writing a psychology lab-report

1.1. An overview of the various sections of a report

Lab-reports are modelled on the scientific journal article. Like them, the report is divided into sections, each of which provides a specific type of information. Here, we provide a short description of what should be contained in each section, followed in each case by a brief illustration from a wholly fictitious and potentially offensive study on national stereotypes.

The precise length of each section will vary, depending on the nature of the study (some studies have more complicated procedures than others, for example, and so need a lengthier description in the "Procedure" section). However a reader would expect to find all of these sections in the report, in this particular order:

- Title.
- Abstract.
- Introduction.
- Method (sub-divided into the following sections:)
 - Design
 - Participants
 - Apparatus and Materials
 - Procedure
- Results
- Discussion
- References.
- Appendices (Not always present).

These sections answer four basic questions:

1. "Why?". Why did I do this particular experiment? What did I expect to find out by doing it? This question is dealt with in the Introduction.

2. "How?". How did I actually carry it out - what procedures and apparatus did I use? This question is covered in the Method section.

3. "What?". What did I find? What were my results? This information is provided in the results section.

4. "So What?" What does it all mean? How do my results relate to previous research on the same topic, and what are their theoretical implications? What are my conclusions? These issues are all dealt with in the Discussion section.

What about all the other bits - the Title, Abstract and References? These have important functions too. The Title enables the reader to get a very quick idea of what the report is about. If they are still interested, they can read the Abstract, which is a summary that provides a brief outline of the main procedures, results and findings of the study. The Reference section allows the reader to obtain further information on the topic of the report, by providing full details of any previous work that the author has referred to. (It also enables the reader to check that the author hasn't misquoted or misrepresented the work of others in the course of citing them!).

The overall length of the report will vary according to the precise nature of the study that's being described. As a very rough guide, a journal article which describes only a single experiment usually comes out to no more than 20 pages or so of double-spaced manuscript,

including references, tables and graphs: about 5000 words in all. The Introduction and Discussion account for about half of this total length.

When in doubt about any aspect of how to write a practical report, there are two ultimate sources of authority. The first and most accessible are journal articles: just go to the library, pick up a journal and see how "real" researchers do it. (Although you don't have to make your report as tedious as some of the ones you might find!) Don't worry too much about the technical bits, the scary statistics and so on: just aim to get a feel for the general style in which articles are written. Pretty much any journal will do, as they all use much the same format, but the "British Journal of Psychology" or the "Journal of Experimental Psychology" spring to mind as good role-models.

The second and definitely the most authoritative source of information are the style guides produced by the British Psychological Society (BPS) and the American Psychological Association (APA). These contain detailed information on every aspect of report writing. The APA are currently up to the fifth edition of their "Publication Manual of the American Psychological Association". While some of it verges on the pedantic, much of it is sound advice, and there are some excellent tips on how to express yourself clearly.

1.2. Title

Provide a succinct title of no more than about 15 words. If it were the title of a journal article, it would be informative enough to enable the reader to identify the paper from the journal's index as something that they would be interested in reading: e.g. "Sex differences in problem solving behaviour" rather than "Sex differences" or "An experiment on problem solving". The following sections will describe a report that could be entitled "*The effects of nationality and age on sun-bed claiming behaviour*": fairly self-explanatory, isn't it? Your title should be too.

1.3. Abstract

This is a brief summary (150 words maximum) of the report. It gives the reader a quick idea of what you did, the main results, and their theoretical implications. It's easiest to write this last, once you have written the rest of the report. Here's the abstract to go with our study of sunbed-claiming behaviour: note that it's only 119 words long, but it gives all the essentials of the study.

The effects of nationality (German, English or American) and age ("young", 20-30 years; or "old", 60-70 years) were measured on latencies to claim sun-beds at an international resort. Ten males of each nationality (five for each age-group) were selected randomly and covertly filmed during the 30 minutes after the pool was opened in the morning. The speed with which each individual moved from the dining room to the sun-bed was recorded. Significant effects of nationality and age were found, but no interaction between them. Germans were faster than the British, who in turn were faster than the Americans. The young of all nationalities were faster than their older counterparts. It is concluded that national stereotypes have some basis in fact.

1.4. Introduction

This part of the report introduces the reader to the topic on which you are going to do your experiment., and provides a justification for *why* you did the experiment. You provide some background information about previous research in this area, and explain why your study was worth doing - how is it likely to add to our knowledge of this topic? Your experiment might aim to plug a gap in our knowledge, or clarify some issue which has arisen from previous research - perhaps previous experiments have produced inconsistent or conflicting results, or perhaps experiments have been done in two separate areas but no-one has thought of linking them together before.

Previous work is cited in a standardised way: in the text of the report, you refer to all previous work by means of the authors' surnames followed by the date of publication (e.g.

"Bonkers (1955)", "Twitch and Cackle (1976)" etc.) ; at the end of the report, there is a reference section which gives the full reference for each work mentioned in the text.

The final paragraph or so of the introduction should outline your proposed experiment, and state (in an informal way) what you predict your results will be, given your knowledge of previous research in this area. Here's an abbreviated example of an introduction (in practice, you might include more information on previous studies and theories):

In recent years, there has been considerable interest in national stereotypes and the extent to which they are valid. Ever since Biggott (1967) reported that French shoppers were significantly more likely to push into a bus queue than were Swiss shoppers, studies have been performed that appear to show that reliable cross-cultural differences exist in what is considered "acceptable" behaviour, even within the Western "developed" nations. For example, Raciste, Morone and Kruelle (2000) recently presented evidence that people from Alsace are significantly more likely to consider dog-beating acceptable than are people from Labrador. Wicked and Hartless (2001) found that 95% of Welsh interviewed claimed that they had watched ritual poodle-drowning; in contrast, 68% of Swedes claimed to find this practice abhorrent.

One problem with all of these studies is that, with the exception of the original work by Biggott, they rely on responses to questionnaires: given that there is often some disparity between what people say they do and their actual behaviours (ThynKin, SeyYing and Doowing 1978), the questionnaire studies may have overestimated the strength of these cultural variations.

One behaviour which has attracted considerable interest is sun-bed claiming: the establishment of priority of access to a sun-bed at a resort by means of placing a towel on it. While there have been previous studies of this phenomenon, they are either so old that cultural practices might have changed in the meantime (e.g., Buonaparte and Nelson's (1805) study of sun-bed claiming behaviour on the Western European coast) or they have failed to use objective behavioural measurements (e.g. as in Krapp and Fewtile's (1966) study, in which individuals of two countries were asked to give ratings of the acceptability of each other's toenail-clipping behaviour). Also, previous studies have failed to take account of the age of the participants, and yet recent research has shown this to be an important variable in cross-cultural behavioural variation. For example, Kebbab, Burghur and Schnitzel (1995) have found that European young people are more pushy at supermarket checkouts than American young people, whereas the reverse is true for old people.

The present study therefore set out to examine age and cultural differences in an overt behaviour (sun-bed claiming behaviour around a hotel pool) using a valid and objective measure of performance: the speed with which individuals moved from one clearly-defined part of the hotel (the dining room) to the sun-bed. On the basis of previous research, it was predicted that there would be national differences in this behaviour which conformed to widely held national stereotypes - i.e., that German tourists will be faster to claim sun-beds than American tourists, who in turn will be faster than the English. It was also expected that there would be some form of interaction between the age and nationality of participants, although the precise nature of that interaction is difficult to predict in advance.

1.5. Method

This tells the reader what you did in your experiment, in enough detail that they could replicate the study in all its important details. It breaks down into sub-sections.

1.5.1. Design

This gives details of the formal design of the experiment - such as whether it was an independent-measures design (in which each condition of the experiment is performed by a separate group of participants) or a repeated-measures design (in which all participants perform all of the conditions of the experiment). It identifies the independent and dependent variables in the study. Remember, the independent variable is what you manipulate, in your role as experimenter, and the dependent variable is what you measure. Here's our "design" section:

This study used a between-subjects design. There were two independent variables: nationality (with three levels: English, German or American) and age (with two levels: 20-30 years old or 60-70 years old).

The dependent variable was "sunbed claiming speed", defined as the time (in seconds) that it took a participant to run from the hotel dining-room to a sun-bed by the hotel swimming pool.

1.5.2. Participants

Give details of who took part in your experiment: provide details of their sex, age and any special characteristics of them that might be relevant to your particular experiment (e.g. handedness, bilingualism, etc.). State whether they were volunteers; whether they were paid for participating; how they were allocated to the different conditions of the study; and of course, how many there were per condition.

There were 30 participants (10 German, 10 English and 10 American), residents of the "Hotel Ripov" during the first week of July 2000. Half of each nationality were between 20-30 years of age (m 26, SD 3.2), and the rest were 60-70 years old (m 64, SD 4.8). All were male, and free from any obvious physical or sensory impairments. Participants took part in the study unwittingly, and therefore remained completely naive about the aims and purpose of the study.

1.5.3. Apparatus

"Apparatus" in this context means things like stopwatches, computers, questionnaires, etc. Give important relevant details (e.g. brand-names and model numbers if the equipment is unusual), but omit trivial and unnecessary details like whether they used an HB pencil or a biro to fill in a questionnaire! Write this section in full English sentences, not as a "shopping-list" of equipment.

Participants' running speeds were measured with a hand-held stopwatch. A video-camera was used to film the participants' behaviour: this was done so that inter-rater reliability checks could later be made on the accuracy with which running speed had been recorded, and also to provide a means of enabling the hotel staff to identify the participants and thus provide the experimenter with information about their nationality and age.

1.5.4. Procedure

Explain how you actually carried out the experiment in practice. Give details of exactly what was done to participants; what they had to do; the order in which tests were administered; and how long test sessions took.

From 7.30 to 8.00 a.m. each morning, the experimenter hid in a clump of bushes in a position that enabled him to see both the hotel's swimming pool and the exit to the hotel's dining room. As a person passed through the French windows of the dining room, the stopwatch was started. It was stopped when the person either placed their towel on a sun-bed (thus establishing "ownership") or sat or lay on the sunbed. This procedure was followed for one week. At the end of each day's covert filming, the film was shown to the hotel manager, who identified the guest and provided information about the guest's nationality and age. The first ten people of each of the predetermined permutations of nationality and age that were filmed, were chosen to be the experimental participants.

1.6. Results

This section falls into two parts, although they don't have sub-headings. First, give descriptive statistics, such as means and standard deviation for each group or condition. Follow these with inferential statistics - the results of statistical tests used to decide whether any differences between groups or conditions were "real" as opposed to merely due to

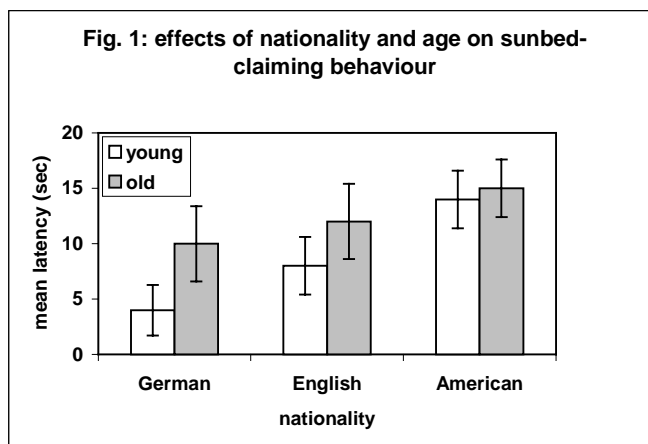
chance. (This will make more sense as you progress through the year). For the inferential statistics, state which test you used; the value of the test statistic; the number of degrees of freedom (where appropriate); and the significance level for this. You do not need to provide a justification of *why* you picked a particular test, nor should you provide any of the calculations for the test.

In most cases the information can be inserted into the text like this: "an independent-means *t*-test was performed. This showed that participants who had received 40mg of the drug 'Pukupp' recalled significantly fewer words than those who had consumed 20 mg ($t(29) = 3.65, p < .001$). If you have lots of results, consider using tables or graphs to display them. However, don't duplicate information unnecessarily: if the results are shown in a table, don't also show them in a graph, or vice versa. Make sure that all tables and graphs are clearly labelled with self-explanatory titles and legends. A good rule of thumb is that the text of the results section should be intelligible to a naive reader without reference to any tables or graphs; and similarly, the tables and graphs should be understandable without reference to the text. All graphs should have error bars, preferably showing each mean plus and minus one standard error. (Again, this will make more sense later in the course).

Don't put raw data in this section. Explain in words what the descriptive and inferential statistics show, but don't interpret them - that's left until the next section. (So, for example, in this section we describe the data on sun-bed claiming speed that we have recorded, and say whether there were any significant differences between the ages and nationalities. Here, you wouldn't speculate about *why* these differences had occurred, or relate these findings to previous data or theories on age and cultural differences in behaviour - all of that should be left until the Discussion).

Figure 1 shows the mean latency to claim a sun-bed (time from dining room to sun bed) for each permutation of nationality and age. (Note that the shorter the latency, the faster the participant). Inspection of fig. 1 suggests that the three nationalities differed in sun-bed claiming speed, with the Germans being fastest, the Americans slowest, and the English falling between these two extremes. There also appears to be some effect of age, with the younger participants of all nationalities being somewhat faster overall than their older counterparts.

A two-way independent-measures ANOVA (nationality: three levels, American, German and



English; age: two levels, younger and older) was performed on these data. There was a significant main effect of nationality ($F(2, 30) = 21.03, p < .0001$). Post-hoc tests revealed that, overall, the German tourists were faster to claim a sun-bed than were the English tourists, who in turn were faster than the Americans (Bonferroni tests, $p < .05$ for all tests). There was also a significant main effect of age ($F(1, 30) = 14.88, p < .01$): regardless of nationality, younger tourists were faster to claim a sun-bed than were older tourists. From fig. 1, it appears that the effects of age were more marked for the Germans and English than they were for the Americans. However, the ANOVA failed to support this interpretation, revealing no significant interaction between age and nationality ($F(2, 30) = 2.34, n.s.$).

1.7. Discussion

Start by briefly restating the main results, in words. Say whether or not they support your experimental hypothesis (as stated at the beginning of the introduction). Then relate your findings to those of previous studies: do your results support previous work, refute it, or force a re-evaluation of earlier findings? If your results are at variance with previous work, why do you think this has happened? What theoretical implications does this have? Basically, you are assessing your experiment's contribution to knowledge in this area of psychology. What faults or limitations did your study have? Do these seriously affect confidence in your findings? How might they be remedied in future work? Suggest possible worthwhile future experiments in this area. Finish by summarising the main conclusions that can be drawn from your study.

Clear effects of nationality and age on sun-bed claiming behaviour were found in this study: German tourists were faster than English tourists to claim a sun-bed, and the English were in turn faster than the Americans. For all nationalities, younger tourists were faster to claim a sun-bed than were older tourists.

These results are in line with previous research showing that there is some validity to commonly-held national stereotypes: there appear to be real cross-cultural differences in behaviour which underlie these beliefs (Biggott 1967; Raciste, Morone and Kruelle 2000; Wicked and Hartless 2001). Biggott's 'Theory of Racially Induced Patterns of Expression' (TRIPE) suggests that cultural and racial stereotypes have their origins in early socialisation patterns which have become slightly different around the world due to geographical isolation. In Raciste et al's 'Framework Accounting Specifically for Culturally Induced Social Traits' (FASCIST) theory, cross-cultural differences stem not from childhood experiences, but instead arise when adults of one culture interact with people of another: The stereotypical behaviours are seen as an attempt by the native population to maintain their social identity in the face of threat from a 'foreigner' or 'outsider'. There is evidence in support of both of these theories., and the present study cannot decide between them conclusively. However, it does demonstrate that, contrary to Raciste et al's assertions, these cross-cultural differences stem from the behaviour of the 'foreigner' rather than the perceptions of the native population in which they find themselves.

Furthermore, most of the earlier researchers based their conclusions on people's verbal reports of how they would behave in various situations: for example, even in Raciste et al's comparatively recent study, participants were merely asked how acceptable they would find dog-beating. How these participants' reactions to a real dog-beating would relate to their verbal claims was not investigated, and yet the relationship between overt behaviour and self-report has been shown to be an important issue (ThynKin, SeyYing and Doowing 1978). In the present experiment, participants' overt behaviour in a naturalistic situation (sun-bed claiming around a hotel pool) was recorded, without their knowledge that their behaviour was being scrutinised. The present study therefore provides important information on how different nationalities behave in practice, and suggests - contrary to ThynKin et al's claims - that cross-cultural differences in overt behaviour are very real and pronounced. The results described here also suggest that these differences have persisted over a comparatively long period of time, given their consistency with the findings of Buonaparte and Nelson (1805).

However, there are a number of factors which need to be considered in evaluating the findings of the present research. First, although the observed differences in sun-bed claiming behaviour were statistically significant, they are small in absolute terms: all nationalities were comparatively quick to claim a sun-bed. The maximum difference in latency, between the young Germans and the old Americans was still only approximately 10 seconds; given that the swimming pool was 200 metres from the dining room, it is clear that all participants were in a hurry to claim a sun-bed. The fact that the hotel had only three sun-beds for 200 residents may have had a part to play in this: a future study should include a greater range of hotels, in order to determine whether the present results generalise to situations in which the resource (i.e. sun-beds) is not in such short supply.

Secondly, although participants were selected who lacked obvious physical infirmities or disorders, it became apparent during the course of the study that the nationalities were not strictly comparable in terms of physical fitness. The Germans had lithe, firm, fit bodies, in contrast to the American and English tourists, most of whom were somewhat rotund. Although it was not possible to measure fitness objectively in the present study (measurements of waist-size obtained from the video

proved unreliable) it was noticeable that many of the English and American tourists waddled to their targeted sun-bed, and then collapsed upon it with a noticeable shortness of breath. Similar behaviour was rarely observed amongst the German tourists. Differences in physical fitness, as opposed to desperation to claim a sunbed, may therefore have contributed to the observed differences in running speed. Most of the difference between the younger and older participants could be attributable to fitness, rather than due to motivational differences. A future study should take care to ensure that participants are more evenly matched in terms of physical fitness than was the case in the present work.

A third problem with this study was that most of the German tourists were on a 3-day holiday, whereas the American and English tourists were all booked into the hotel for 14 days. The Germans therefore had less time in which to sun-bathe, a factor which may have contributed to the difference between their behaviour and that of the other two nationalities. However, clearly not all differences in sun-bed claiming behaviour can be attributed to this factor, given that there was also a difference in behaviour between the American and English tourists. Future research should take greater care to ensure that the participants are better matched on any factors such as holiday stay, which might have a significant effect on their motivational level.

Finally, the present study demonstrates a behavioural basis for a national stereotype in only one domain: sun-bed claiming behaviour. It remains to be determined whether these differences hold true across situations, or are specific to the hotel pool environment.

1.8. References

Here you provide, in alphabetical order and in a very standardised format, full details of every work that was cited in the body of the text. Here are the references from our fictitious study:

Biggott, R.S. (1967) National differences in queue-jumping behaviour: an observational study. *Journal of Irreproducible Results*, 17 (1), 296-305.

Buonaparte, N. and Nelson, H. (1805, March 21). An analysis of sun-bed claiming behaviour in Western Europe. *Seafaring Weekly*, 75, 46-49.

Kebbab, D., Burghur, S. and Schnitzel, Y.P. (1995) 'Pushiness' at supermarket checkouts as a function of age and nationality. *Journal of Shopping Behaviour*, 5 (2), 36-42.

Krapp, N.A. and Fewtile, T. (1966) Cultural differences in the acceptability of toenail-clipping behaviour. *Pedicure*, 36 (1), 12-15.

Raciste, P., Morone, C. and Kruelle, W. (2000) Alsatians and Labradors have different attitudes to dog-beating. *Trivia*, 4 (3), 1215-1320.

Thynkin, P.P.O., SeyYin, M.G. and Doowing, D. (1978) An assessment of the validity of measuring cultural variations by questionnaire. In R.S. Biggott, (Ed.) *Cultural Variation* (pp. 114-190). Ohio: Worthless Books.

Wikked, H. and Hartless, P. (2001) A survey of poodle-drowning practices amongst the Welsh and Swedish. *Marie Eclair*, 101 (2), 200-203.

Things to check that you have covered in your report

When you are writing your lab-reports, check that you have covered the following points.

General:

Write clearly and simply, but in a formal style, using the passive voice. (e.g. "an experiment was performed" rather than "we performed an experiment").

Title and Abstract:

1. Give your report a clear and informative title, no more than 10-15 words long.

2. The Abstract is a clear summary of the study's aims, methods, findings and conclusions, all in no more than 150 words.

Introduction:

1. Summarise RELEVANT experimental findings and theories which relate to the aims of your experiment. Use this information to provide a justification for why your experiment is worth doing.
2. Outline your proposed experiment.
3. Make specific predictions about the outcome of the experiment, on the basis of the literature you have reviewed.

Method:

1. Include sub-sections on: Design; Participants; Apparatus; Procedure.
2. Make sure there is enough RELEVANT detail for the reader to be able to repeat the experiment purely by reading your Method section.
3. In the Design section, identify the independent and dependent variables, and say whether you used independent measures, repeated measures or a mixed design.
4. Make sure you give RELEVANT background characteristics of the sample of participants, as well as saying how many took part.
5. Make sure the Apparatus and Procedure sections are written in proper English, and not like a recipe.

Results:

1. Make sure you have clearly described the results and explained whether the evidence (in general) supports the hypothesis under consideration. Describe them; but leave interpretation (in terms of relationship to theories and previous experimental work) until the Discussion section.
2. If you have a fair amount of numerical data, put it in a table or graph, whichever seems clearest.
3. Number your tables and figures so that you can refer to them in the text. Figures and tables are numbered independently of each other, so if you have, say, five graphs or diagrams and three tables, these would be numbered as figures 1 to 5 and tables 1 to 3. Even if you have just one table or figure, refer to it as "table 1" or "figure 1" - rather than using phrases like "the graph shows..."
4. Make sure each table or graph is clearly labelled and has a self-explanatory title.
5. Make sure tables and graphs are intelligible without reference to the text, and vice versa.
6. Where inferential statistics are used, indicate the statistic that was used (e.g. *t*, *F*, etc.). Give the value of the statistic used, the number of degrees of freedom, the level of significance reached, and whether the test was one-tailed or two-tailed.
7. Put raw data and statistical calculations in an appendix, not in the main text.
8. Remember to include means and standard deviations (or medians and ranges or semi-interquartile ranges, if these are more appropriate).

Discussion:

1. Summarise your main results.
2. Provide some interpretation of what your results mean, in theoretical terms.
3. Indicate clearly whether or not your initial hypothesis has been accepted.
4. Discuss your own data with reference to other experimental findings and theories in the area, particularly those summarised in the introduction.
5. Identify potential problems with your study, but don't produce a litany of trivial criticisms. Make intelligent suggestions for future studies.

References:

1. Give only the surname(s) of the author(s) and the date of the relevant publication in the text, unless you are acknowledging the source of a direct quote - in which case give the number of the page on which the quote can be found.

2. In the reference section itself, at the end of the report, give the references in the correct format.
4. If a source you have used (e.g., Smith 1991) cites an author to whom you wish to refer (e.g., Bloggs 1950), it must appear in the text as follows: "Bloggs (1950, cited in Smith 1991)". Smith (1991) should be the reference which appears in the list at the end of your report, not Bloggs (1950).

1.9. More on Referencing Previous Work:

In a lab-report, there are two main ways of referring to previous work. Within the text of the report itself (i.e., principally in the Introduction and Discussion), references are cited by giving the author's surname and the year of publication. At the end of the report, there is a section entitled "References", and this gives full details of all of the references for which you gave surname and date in the text. (This is the so-called "Harvard" system of referencing. There is another method, the "Chicago" system, that is used in "Science" and many medical journals. Little numbers in the text refer to the full references in the Reference Section at the end of the article. In the Reference Section the references are listed in order of appearance in the text. Unless you are going to submit your lab-report for publication in "Science", don't use this system).

The whole purpose of the reference section is to enable the reader to gain access to the works that you have cited throughout your report. To ensure that sufficient information is provided in a reference list for this to be possible, the American Psychological Association and the British Psychological Society have laid down very clear, specific and detailed conventions for how to produce reference lists. In what follows, we will follow the APA's guidelines on referencing.

1.9.1. *Conventions for references cited in the body of the report*

1.9.1.1. *Citing works by a single author*

Give the author's surname and the year of publication, as in the following examples. You can write them like this:

- "Tardive (1995) claimed that schizophrenia was caused by evil spirits".
- "Studies by Legless (1994, 1987) indicate that drunk people tend to overestimate the attractiveness of members of the opposite sex".

Or like this:

- "It has been claimed that schizophrenia is caused by evil spirits (Tardive,1995)".
- "Evidence suggests that drunk people tend to overestimate the attractiveness of the opposite sex (Legless,1994)".

Both versions use only the surname and date. The only time you include the author's initials is in order to differentiate between two different authors with the same surname, as in this example:

- "J. Tardive's (1995) results are at odds with those of C. Tardive (1955)".

1.9.1.2. *Citing works by multiple authors*

How you refer to these depends how many authors there are. If there are only two authors, give both surnames each time the reference is cited, as in "Tardive and Kattatonier (2000)

have now abandoned exorcism as a treatment for schizophrenia" or "Exorcism has now been abandoned as a treatment for schizophrenia (Tardive and Kattatonier, 2000).

If there are three, four or five authors, the first time a reference is mentioned, give the surnames of all of the authors and the date of publication. Thereafter, if there are more than two authors, use only the first author's surname, followed by "et al." and the date. ("et al." is Latin for "and all the rest of 'em"). So, the first time a study is mentioned, you might write:

"Tardive, Kattatonia, Diskenisia and Parrenoide (2000) claimed that schizophrenia could be alleviated by blood-letting". Later on, referring to the same study, you would write "There were a number of problems with the study by Tardive et al. (2000)".

If there are more than six authors, use the first author's name and "et al." from the very first mention of the reference.

Sometimes the same authors manage to churn out more than one paper or book in a year. In this case, differentiate between them by using letters after the date. Thus, you might refer to Tardive and Wibble (1981a) and Tardive and Wibble (1981b). What if two multi-author references shorten to the same form? For example, "Tardive, Kattatonia and Diskenisia (2000)" shortens to "Tardive et al (2000)", but so too does "Tardive, Diskenisia, Kattatonia and Parrenoide (2000)". In situations like this, cite the first author's surname plus as many of the subsequent authors as are needed to distinguish between the two references. So, in this example, the abbreviated versions would be "Tardive et al. (2000)" and "Tardive, Diskenisia et al. (2000)" respectively.

1.9.1.3. Citing works by organisations or groups

Sometimes works are produced by anonymous, faceless organisations or committees rather than individuals. If the organisation has a long and unwieldy name and a familiar or easily understandable abbreviation, mention the name in full the first time you cite the study, and use the abbreviation subsequently. For example, "Consumption of carrots improved readers' eyesight (Centre for Research into Applied Perception [CRAP], 1995)". If the name is short or the abbreviation would not be easily understandable, use the full name each time the work is cited. (Thus, if you happen to be citing both "Alcoholics Anonymous" and the "Automobile Association" in the same report, write them out in full each time).

1.9.1.4. Citing multiple references

You might want to refer to a number of studies all at once. The most succinct way of doing this is to put all of the references that you want to cite in brackets at the end of the statement to which they refer. Arrange them in the same order as they will appear in the reference list at the end of the report, and separate them with semi-colons.

"Blood-letting and purges have been claimed to be effective treatments for schizophrenia (Dobbs, 1998;Tardive, Dobbs, Wibble and Wobble 1995; Wibble and Wobble 2000)".

Note that these surnames are in alphabetical order (i.e., as they will be shown in the Reference section).

If there are two works by the same author, put the references in date order. You don't need to repeat the name. Thus you would write "(Dobbs, 1998, 1999)" or "(Dobbs, 1998a, 1998b)". The same goes if you are referring to more than one work by the same set of authors (as long as their names appear in the same order each time). Thus you would write "Little is known about the aetiology of long-term coma (Sneezy, Bashful and Dopey, 1978,1999, 2001)" to refer to three works by Sneezy and his chums that all had the authors' names in this order. However, suppose the names had appeared in different orders; then you would write all of the references in full and put them in alphabetical order within the brackets: "(Bashful, Sneezy and Dopey, 1999; Dopey, Sneezy and Bashful 2001; Sneezy, Bashful and Dopey 1978)".

1.9.1.5. Quotations

"Whoahh, mate, looking at the state of that guttering, I reckon it's gonna cost ya at least 500 quid". Whoops, sorry, wrong type of quotation: the ones we're going to discuss here are the

elegant bon mots bandied about by previous researchers that you want to cite word for word in your report. The APA suggests that short quotations (less than 40 words) should be incorporated into the text, surrounded by double inverted commas, like this: "The minute you have a couple of pints, ugly blokes transform miraculously into Brad Pitt" (Drunkwoman, 1996: p. 154).

Longer quotations should be in a separate block of text, with no quotation marks. The whole block should be indented by about half an inch from the left margin, like this:

"Quotations are no substitute for trying to put things into your own words. Don't think you can hide your own poor writing style by just cobbling together lots of extended quotations - your tutor will probably see through the ruse (Hole 2001, p.999)".

As in these examples, give the author, year of publication and the number of the page from which the quotation came. In the references list, of course, you supply the complete reference. Quotations should be accurate: this may seem an odd thing to say, but you would be surprised how many times I've marked an essay or a report in which a quotation was very obviously reported wrongly. If you want to emphasise part of the original, use italics, but make it clear that they are your italics rather than the original writer's, like this: "Professor Kwotashun is an arrant knave, [italics added] as well as a complete charlatan". If you want to distance yourself from the original writer's grammatical or spelling errors, show the errors are theirs by using "sic", in italics and enclosed in square brackets: "Professor Kwotashun is an arrunt [sic] knave".

There are a number of minor changes you might need to make to a quotation, so that it fits in with your own text. Some of these don't have to be acknowledged: for example, you might want to change the first letter of the quotation from uppercase to lower case, or alter the final punctuation mark in the quotation from a comma to a full stop.

Sometimes you may want to omit material from a quotation, in order to shorten it or because some of the material is irrelevant to your argument. If you do this, you show that you have shortened the quotation by using three full stops, in place of the missing material. For example, suppose the original quotation was "Professor Kwotashun's hobbies include gerbil grooming, delousing his cat, and - when he can find the time in his busy daily schedule of elephant hunting - cultivating bonsai Venus Flytraps". This might be shortened to " Professor Kwotashun's hobbies include gerbil grooming, delousing his cat, and ... cultivating bonsai Venus Flytraps".

If you want to add material to a quotation (perhaps because it wouldn't make sense out of context), enclose it within square brackets like this: "Professor Kwotashun's hobbies [following his decline into insanity] include gerbil grooming".

What do you do if the author of the quotation has included a reference to another work, like this? "According to Kohma (2000), the best thing that you can say about Sopperifik's new book is that it does have a nice cover (Sparkout 2001, p.366)". In these circumstances, retain the citation within the quotation (after all, it is part of the quotation). However, unless you cite Kohma (2000) yourself, elsewhere within your own report, you don't have to include her work in your reference list.

1.9.2. *Conventions for references in the Reference Section at the end of the report*

As a basic guide, you need to provide enough information for the reader to be able to track down the references that you used in the text. (This enables the reader to go off and read these references for themselves, in order to see if you have misquoted or misinterpreted the authors concerned. Science is all about having a healthy distrust for everyone else's research and claims). With the exception of personal communications (see preceding section), every reference cited in the text should have a corresponding full version in the reference list, and vice versa.

The APA make a useful distinction between a "Reference List" and a "Bibliography". A "Reference List" contains references to material directly used in the research and preparation of the report, i.e. the stuff cited in the text. A "Bibliography" contains references to works for further information or background reading. A journal article (and your lab report) should contain only a Reference List, and not a Bibliography.

Where full examples are given below, note that they follow APA format to the letter (and to the punctuation mark as well!) Your own references should be exactly the same. Only a selection of all the possible types of reference that you might need to supply are listed here: for a truly exhaustive account, consult the APA Publication Manual, which contains 74 pages on the issue of referencing, and includes many examples of how your references should look.

1.9.2.1. *Journal Articles*

Give each author's surname, followed by their initials; the year of publication; the title of the journal; the volume (including part number, where appropriate - see below); and the page numbers.

- Tardive, A.H., Diskenesia, K., & Parranoide, W.M. (1995). Trepanning as a cure for schizophrenia. *Journal of Dubious Research*, 26, 225-226.

If there are more than six authors (!) list the first six, and then use "et al." to refer to the rest.

Most journals are published in parts during a calendar year, usually one part appearing every three months. In most journals, the page numbers start at 1 at the beginning of the year, and continue throughout the various parts for that year. However, some journals start each part with 1. In the case of the latter, give the part number of the journal as well as the volume number, like this:

- Tardive, A.H., Diskenesia, K., & Parranoide, W.M. (1995). Trepanning as a cure for schizophrenia. *Journal of Dubious Research*, 26 (3), 225-226.

Some journals are published more frequently, either monthly or weekly ("Nature" is a good example of this). In these cases, give the month (if it's published monthly) or month and day of publication (if it's a weekly), like this:

- Obsessive, A., Compulsive, D. & Disorder, T. (2000, November 21). Yet another modification to our revised model of the causes of OCD. *Nature* 300, 1110-1105.

1.9.2.2. *Books*

Give the author's surname and initials; the year of publication; the title of the book; the geographical location of the publisher; and the publisher's name.

- Tardive, A.H. (1992). *My life as a quack*. Beirut: Walford University Press.

1.9.2.3. *Articles or chapters in a book*

First, give the author and title of the chapter, then the details of the editor, title and publisher of the book. For example:

- Tardive, A.H. (1992). How to avoid litigation from schizophrenics. In H. Hamster, (Ed.), *Dubious research and how to conduct it* (pp. 119-155). Liverpool: Brookside Associates.

(Note how, in this case, the surname and initials of the book's author are not switched round: in other words, write H. Hamster rather than Hamster, H.).

1.9.2.4. *Electronic references*

It is becoming increasingly commonplace for students and researchers to cite information that they have obtained via the Internet. This information comes in various types: it might be an electronic version of an article which is also published on paper, say in a journal; or it might be material which is available only on a person's web-site (perhaps because it's a lecturer's teaching notes, or some other form of material which is not otherwise published). As with more traditional references, the idea is to make it as easy as possible for the reader to track down the original source if they so wish. However, there are a few differences. First, a complication with Web-based materials is that they are rather more ephemeral than books and journals, since they are so easily changed or moved to another location. Therefore the reference should give the precise address of the material (its "uniform resource locator" or "URL", in the jargon) but also the date on which you retrieved the material. Second, page numbers generally don't have much meaning as far as electronic sources are concerned, so you normally won't have to provide these. Thirdly, a minor typographical error will probably make little difference to a conventional reference, but will probably make a URL unusable, so make sure your URL's are perfectly correct. Here's an example of how to cite a Web address:

- Electronic reference formats recommended by the American Psychological Association. (2000, October 12). Retrieved October 23, 2000, from <http://www.apa.org/journals/webref.html>

(Notice that if the reference ends with the Internet address, as it does here, you don't end it with a full stop: that's so readers don't mistakenly think the full stop is part of the net address).

If there's no date to the document, use (n.d.) in your reference to show this. Where possible, give a URL that will take the reader directly to the material that you cited, rather than to a home page.

1.9.2.5. *Order of presentation of references*

References should be placed in alphabetical order. If you have more than one reference from a given first author, place them in date order, earliest first, and then arrange them in this sequence: single-author first; multiple authors second. Where there are a number of works by a given author in collaboration with other authors, arrange these references in alphabetical order based on the surnames of the other authors.

Here's a set of references in the correct order, worth an explanation of why each one follows the one before it in the list:

Tardive, G. 1922.

Tardive, G. 2000. (It's the same author as the previous reference, but a later date).

Tardive, P. 1996. (P. comes later than G. in the alphabet).

Tardive, Waggle and Wobble (1967). (Multi-author works by an author follow that author's single-author works).

Tardive and Wibble (1985). (Wibble follows Waggle in the alphabet).

Tardive, Wibble and Wobble (1981). (This has the same alphabetical position as the previous reference, but it has more authors).

Tardive, Wibble and Wobble (1992). (This has the same authors as the previous reference, but a later date).

Tardive, Wibble, Wobble and Waggle (1991). (This has the same alphabetical position as the previous reference, but it has more authors).

Now suppose that Tardive and Wibble wrote two papers in 1985: if so, these would go in alphabetical order based on the title (ignoring "A" or "The"), like this:

Tardive and Wibble (1985a) "The Root causes of schizophrenia: excessive pressure in the head".

Tardive and Wibble (1985b) "A Theory of schizophrenia and trepanning as a proposed cure".

If there is no author (i.e., the work has been produced by an institution such as the American Psychological Association), treat the organisation as the author, writing their name in full, and insert them into the appropriate alphabetically-determined position in your reading list:

American Psychological Association (2001). *Publication Manual of the American Psychological Association, Fifth Edition*.

1.9.3. *Primary and Secondary References*

Primary references are those that you have read yourself. Secondary references are references that you haven't actually seen yourself; you have only read a description of them in someone else's work. Ideally, you should aim to use primary references. This is generally preferable to obtaining information second-hand, via another author who might be providing a misleading, distorted or biased account of the original authors' results and conclusions. (We're not saying that secondary sources deliberately set out to mislead, but mistakes or misunderstandings can happen).

There are a few problems with using primary references. Firstly, the reference might be hard to read, for stylistic or technical reasons (it's generally easier to read an account of Piaget's work by someone other than Piaget, for example). Secondly, you might get bogged down in the details, in a way that you might not with someone else's potted account of that research. Thirdly, you may not be able to get hold of the original article or book - a variant of Sod's Law is that the articles that appear to be most interesting to you generally seem to be in the most obscure and inaccessible journals!

Because of these problems, you may be stuck with using secondary references, at least to some extent. There are two ways of referencing these. One is to lie, and pretend you have read the primary reference. The problem with this is that your tutor will probably know you are lying, especially if the primary reference is an obscure one. The honest way to deal with secondary references is to acknowledge their origins. This is done as follows. Suppose we want to refer to work by Tardive (1995) which we have only read about in a later article by Gubbins (2000). In the text, we would write "It has been claimed that schizophrenia can be cured by blood-letting (Tardive 1995, as cited in Gubbins 2000)". Alternatively, we might write "Tardive (1995, as cited in Gubbins 2000) claimed that schizophrenia can be cured by blood-letting". This makes it clear to the reader that Tardive's work is being talked about, but that you are taking Gubbins' word for it. Secondary references do not appear in the reference section: there, you would include a full reference for Gubbins (2000), but not for Tardive (1995).