

PSYC 2018: Research Methods 2

Formatting of Tables and Figures (APA guidelines)

Some general background

The American Psychological Association (APA) publishes guidelines for authors in the discipline of psychology in a 400 plus page tome called the *APA Publication Manual*. This provides a consistent framework for authors and students in psychology to follow. The rationale is that it is easier to read work if everyone in the discipline follows the same format for presenting their work. Confusion is likely to arise if everyone decides to format their work in whatever manner they feel like.

As such, part of your learning in psychology is to learn the APA formatting guidelines. Obviously, we do not require nor expect you to learn them all. If you go on to do postgraduate work, then we would expect you to know a lot more. For now, we will just introduce you to some of the more common and basic issues. In another handout, we discuss APA guidelines for referencing. Here we focus on the presentation of Tables and Figures.

It is worth bearing in mind that you may well read journal articles from other disciplines (e.g., medicine, sociology, etc.) which will all use different formatting guidelines. This is unavoidable. In fact, even within psychology, there are variations and departures from the APA guidelines although many of the major journals adhere to the guidelines. Nevertheless, during your studies, you are expected to follow the guidelines and rules of APA formatting that you have been taught.

Some recommended other sources

Burton, L. J. (2007). *An interactive approach to writing essays and research reports in psychology* (2nd ed.). Milton, Qld, Australia: Wiley.

I have tried to ensure consistency between the notes in this handout and the material of Burton. If there are any variations, please post something on FLO. Nevertheless, if variations exist, there will be no penalties in assignments as long as you consistently follow any one of these sources (i.e., this handout or Burton, 2007).

Key issues when formatting Tables and Figures

- The most common non-word features of a research report or essay or thesis are tables and graphs. Graphs come under the broad heading of Figures. Figures also include drawings and photographs. The main emphasis here is on tables and graphs although any general principles (e.g., title requirements) for graphs also apply to drawings and photographs.
- Tables and graphs provide convenient and efficient ways to present large quantities of complex data in a concise and comprehensible manner. As such, they should not be used for presenting data that is just as easy to understand if presented in words. For example, presenting a graph or table that simply shows

the number (or proportion) of males and females in your sample is not efficient. Simply saying something like - “There were 43 females and 28 males in the sample” - gets the message across and in a very succinct and simple way. Providing a graph or table does not make it any clearer and so should be avoided.

- All tables and graphs that are included in a report (or assignment or thesis) should be referred to explicitly in the text and discussed (or interpreted) in the text.

“As can be seen in Table 1, young adults recalled more accurate details than older adults across all conditions of the study. Furthermore, ...”

- All tables and graphs are numbered in the order they appear. This appears in the table or figure title:

Table # or Figure # where # is the number

- Titles for tables and figures follow a specified format but vary as follows:
 - Tables: The first line is Table # flush-left (note case; capital T, lower case elsewhere – also this is in normal font). The title then begins on the next line. It should be as informative as possible. It should clearly describe the data presented.¹ Commonly, titles in student assignments (and in some journal articles) are insufficient to describe what is contained within. The title is presented in italics with words beginning with a capital letter except for joining words (such as “of”, “and”, “or”).² See the examples that follow. Titles for tables go above the table.
 - Figures: The first line is *Figure #*, flush-left (note case; capital F, lower case elsewhere). In contrast with tables, the words “Figure #” are in italics and followed by a full stop. This is followed by a single space and then the title. Again, it should be as informative as possible. For figures, this can be very long (see example - Figure 3). For figures, the title is presented in normal font with only the first word in any sentence beginning with a capital letter. See the examples that follow. Titles for figures go below the figure.
- Notes can be added to tables to provide further explanation. See various examples in Tables 2 and 3 that follow.³ It is also possible to add notes to

¹ A useful rule to adopt is that a title (for both a table and a figure) should give enough information so that an intelligent reader has a good idea about what the data (or picture) in the table or graph is about without having to read the accompanying text. They don’t necessarily have to know what the implications of the data are, simply what is represented.

² The APA rule for submitting manuscripts is to present everything (title plus text within tables) in double line spacing. However, it gets translated in the finished product to single line spacing with small spacings (say, about 3 points) above and below lines. Since your assignments are essentially finished products (and *not* manuscripts), for this topic, I am happy for you to vary the spacing if you want since the tables and graphs often look poor when everything is double spaced. Nevertheless, your use of spacing will not be considered in assessing your work.

³ At the present time, most of you will be unfamiliar with the concept of a *p* value. This relates to inferential statistics and will be introduced in second term this year. For now, you can just ignore this issue but hopefully it should become clearer at a later point.

figures but this is rarely done. Information included in table notes are usually incorporated into the title for figures; see example Figures 2 and 3.

- Note the sparing use of borders in tables. Only horizontal borders are used and these are primarily used to delineate column labels from the data in the table as well as to indicate the beginning (top) and end (bottom) of the table. The first column invariably contains row labels. Note that tables created in SPSS nearly always violate this rule (as well as the title rules) and my advice is never to directly copy a table from SPSS – create your own (it is a good idea to learn to do these in your usual word-processing package; e.g., Word).
- There are some useful rules to learn for the presentation of graphs.
 - There is no border around the graph.
 - Use lines or bars of different styles (vary thickness, vary line style [e.g., continuous/dashed/dotted], vary the shading of bars). You can vary the colour of lines/bars, although it is preferable to avoid this if possible. Try to use black and white (and shades of grey).
 - Label your axes appropriately and clearly. However, they should also be concise. Bear in mind that more detail can be included in your title.
 - Where the axis consists of numbers representing a continuum, choose an appropriate scale. Most graphing packages use a restricted range of scores as the default setting so as to maximize the view of the data. However, this invariably makes the effects in the data look greater than they really are. Choose a scale that represents the data you collected. For example, suppose the possible range of scores on a variable is 1 to 7, then a good choice of scale is also 1 – 7. If you have a data set whereby scores are rarely observed in a part of the range, you may use the minimum and maximum values observed (or a close approximation) to reflect your chosen scale. For example, suppose you are looking at exam performance of PSYC 2009 students. Although the potential range is 0% to 100%, the observed range might be 32% to 96%. In this case, a more suitable scale for your graph might be 30-100%.
 - As for tables, graphs created in SPSS nearly always violate most of these rules and my advice is never to directly copy a graph from SPSS. At the very least, edit the graph in SPSS before copying it. Nevertheless, my advice is to create your own (programs such as Excel do a pretty good job here – spending some time learning how to do this would be useful).⁴
 - Strictly speaking (you may come across numerous violations), line graphs (see examples – Figures 1, 3, 5) should only be used when the variable plotted on the x-axis (i.e., the horizontal axis) is a quantitative/continuous measure. If it is categorical (i.e., refers to different groups), then bar graphs (see examples – Figures 2 & 4) are more appropriate.

⁴ For assignments, I am happy for students to draw their own graphs by hand (as long as it is done neatly) and then physically pasted into the final assignment.

- o In practice it is nearly always useful to give an index of variability for each data point in a line graph or each bar in a bar graph. For tables, where we include means, we do this easily by including the standard deviation with each mean. For graphs, the tendency is to use a different index of variability; namely, the standard error. You can always use standard deviations (like in Figure 1) but most researchers tend to use standard errors (like in Figure 2).⁵

Example Tables and Figures

Table 1

Mean Number of Accurate Details (of 16) Reported in Recall 1 and 2, Broken Down by Age and Experimental Condition (Standard Deviations in Parentheses)

	Recall 1			
	Control	Biased narrative	Biased confederate	Total
Young adults	10.19 (2.07)	9.86 (2.17)	10.08 (1.89)	10.04 (2.04)
Older adults	7.65 (2.30)	7.41 (2.02)	8.15 (2.49)	7.74 (2.27)
Total	8.96 (2.18)	8.67 (2.10)	9.14 (2.20)	8.92 (2.16)
	Recall 2			
	Control	Biased narrative	Biased confederate	Total
Young adults	11.44 (1.96)	10.92 (1.90)	11.33 (2.07)	11.23 (1.98)
Older adults	8.35 (2.24)	7.94 (1.77)	10.44 (2.36)	8.91 (2.24)
Total	9.94 (2.10)	9.38 (1.84)	10.90 (2.22)	10.07 (2.05)

Note. Totals represent means and standard deviation across all conditions and/or across both age groups.

⁵ For your assignments this year, if you include graphs, we will not expect you to include error bars. But if you get to Honours, then we'd expect them at that point. [In Excel, you can create them by clicking on a bar or a data point (making sure only the relevant bar/data point is highlighted) and going to the "Y error bars" tab in the "Format Data Series" dialog box. But we don't expect this.]

Table 2
Correlations Between Measures of Alexithymia and Mental Well-being

Alexithymia measure	Mental well-being					
	<i>N</i>	PA ^a	NA ^b	Anxiety	Depression	QOL
DIE	248	-.21**	.25**	.35**	.22**	-.32**
DDE	248	-.10	.37**	.27**	.17**	-.28**
EOT	248	-.07	-.15*	-.25**	.08	.06
Fantasy	248	-.05	.09	.25**	.00	-.11
Emotionalizing	121	.22*	-.07	-.03	-.04	.12

^a Positive affect.

^b Negative affect; QOL = quality of life

* $p < .05$.

** $p < .01$.

Table 3
Mean Ratings on Dependent Variables in Study 2 as a Function of Affirmative Action (AA) Program

Dependent variable	AA program			
	ET	Tie	PT	Total
Merit violation	2.99 (1.49)	3.04 (1.89)	5.80 (1.70)	3.94 (1.84)
Consistency violation	3.14 (1.65)	3.94 (1.71)	5.77 (1.28)	4.28 (1.69)
Opposition	2.08 (0.81)	3.36 (1.42)	5.48 (1.05)	3.64 (1.30)

Note. ET = equal treatment; PT = preferential treatment. Standard deviations are in parentheses. Higher scores (1-7) reflect more of the construct. $N = 86$.

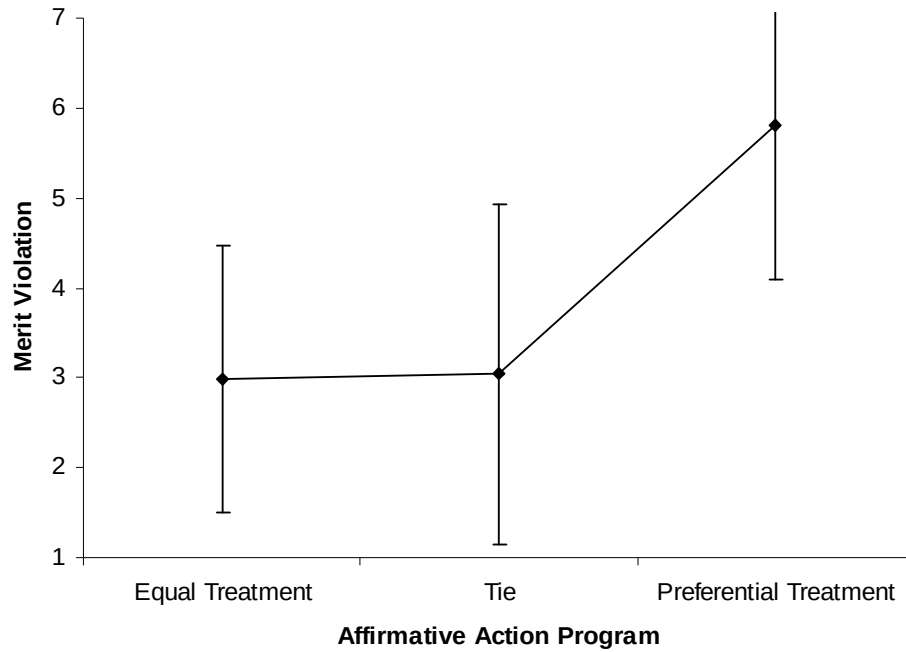


Figure 1. Mean rating of merit violation as a function of the Affirmative Action Program. Bars represent standard deviations for each rating.

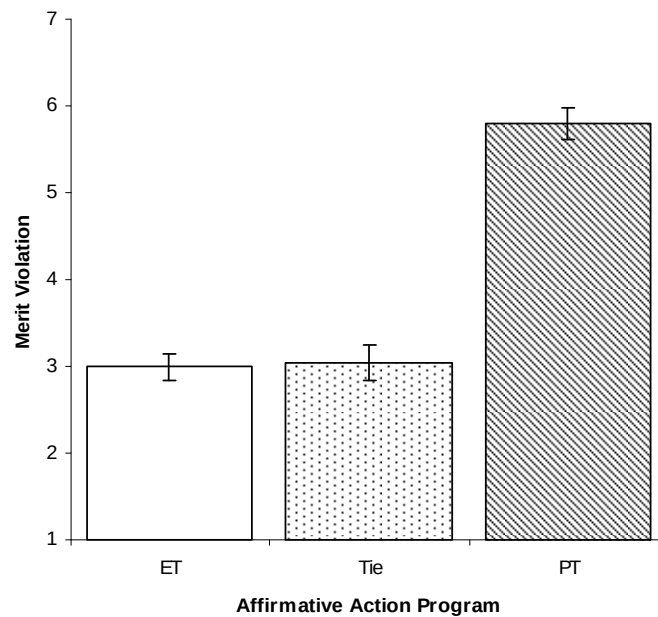


Figure 2. Mean rating of merit violation for the three Affirmative Action Programs. ET = Equal Treatment; PT = Preferential Treatment. Bars represent standard errors of measurement for each rating.

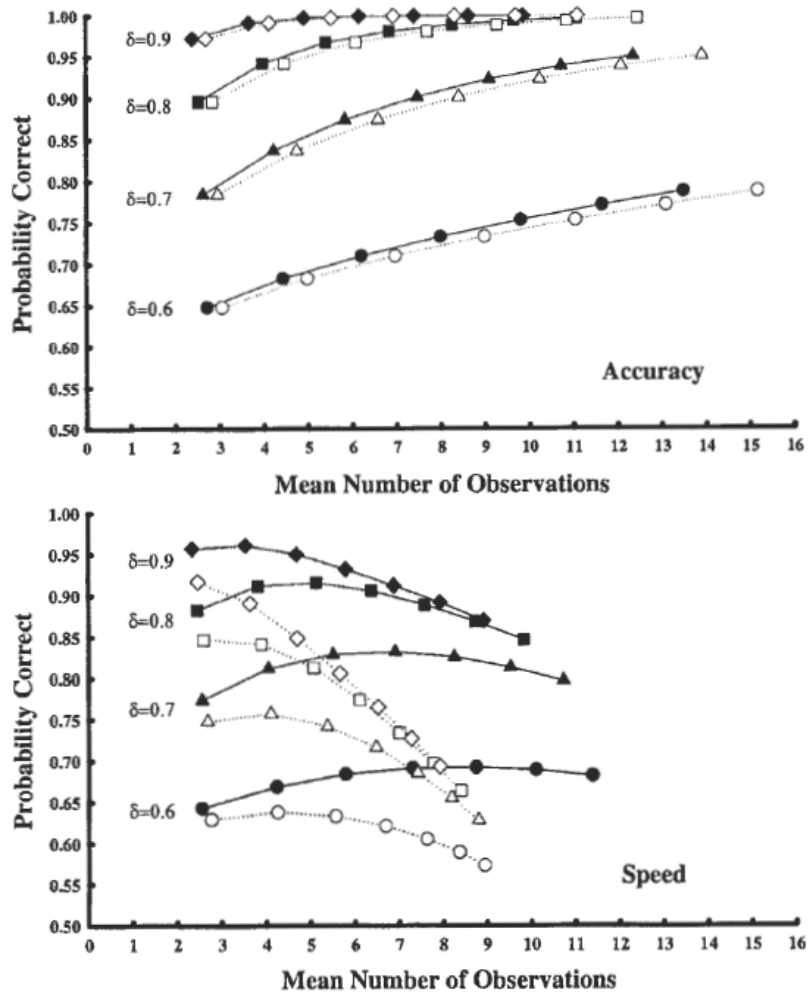


Figure 3. Upper panel: Theoretical speed-accuracy trade-off functions produced by slow and fast guessing theory (SFGT) under an accuracy emphasis ($\alpha_3 = 20$). Four levels of discriminability (δ) are provided: .6 (circles), .7 (triangles), .8 (squares), and .9 (diamonds). The seven points for each symbol, from left to right, denote the effect of increasing the primary decisional criteria ($\alpha_1 = \alpha_2$) from 2 to 8. Solid points denote a smaller interval of uncertainty ($p_3 = .10$), and open points denote a larger interval of uncertainty ($p_3 = .20$). Lower panel: Theoretical speed-accuracy trade-off functions produced by the SFGT under a speed emphasis ($\alpha_3 = 2$). All other parameters are unchanged.

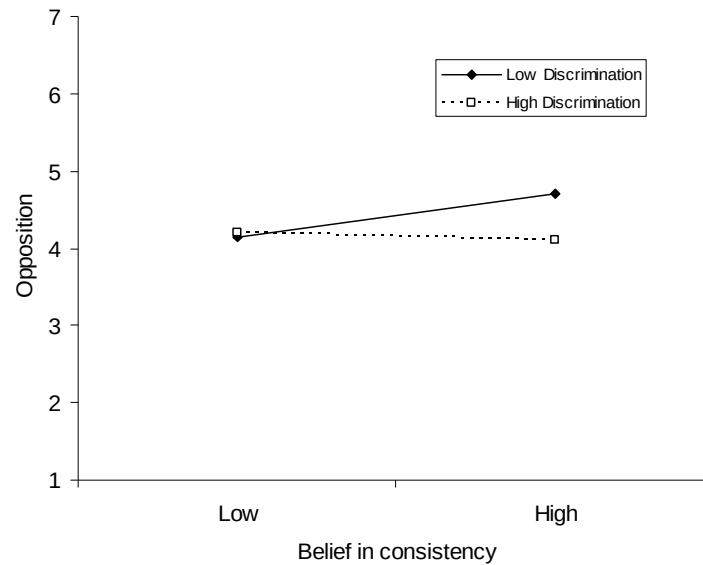


Figure 4. The moderating effect of perceptions of workplace discrimination in the relation between belief in consistency and opposition to the Tie program in Study 2. The graph depicts the relation between participants' scores on BIC (low and high) and opposition to the Tie program as a function of their perceptions of workplace discrimination (low and high). On both predictors, low = two standard deviations below the mean, centred at zero; high = two standard deviations above the mean. $N = 83$.

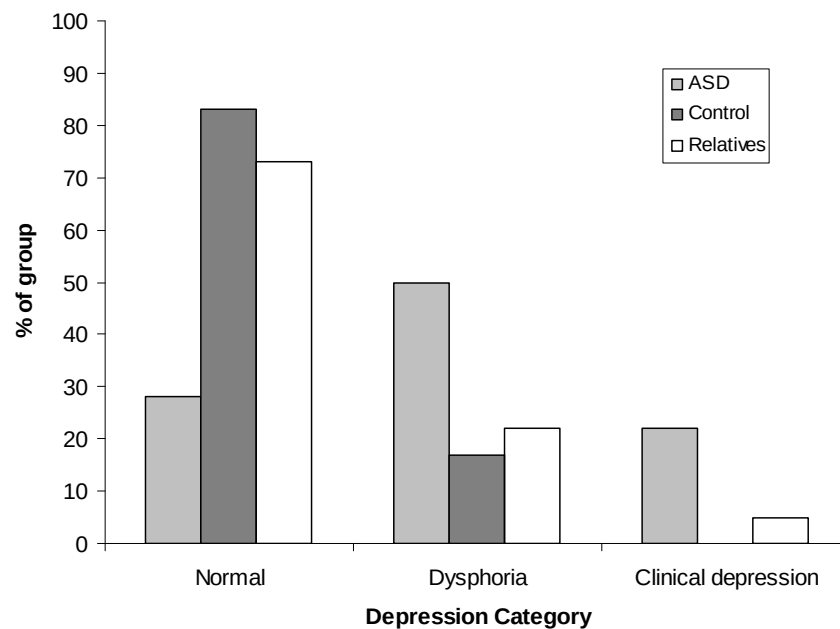


Figure 5. Percentage of each participant group (ASD = Autism Spectrum Disorder) falling into each depression category (non-depressed, dysphoria, clinical depression) on the Beck Depression inventory.

Notes on the example tables and figures

Table 1. This is taken from Gabbert et al. (2004).

Table 2. This is taken from Henry et al. (2006).

Table 3. This is taken from Bobocel et al. (1998).

Figure 1. This does not appear in Bobocel et al. (1998) but is based on their data. This reflects a one-way between-subjects design. The independent variable is affirmative action program type with three levels (equal treatment, tie, preferential treatment).

Figure 2. This also does not appear in Bobocel et al. (1998) but is also based on their data. It is a variation of Figure 1 (and more appropriate since the independent variable, AA group, is categorical).

Figure 3. This is taken from Baranski & Petrusic (2003).

Figure 4. This is taken from Bobocel et al. (2006). Note that a line graph is used. This is appropriate because the “independent variable” (in this case, strictly a predictor variable), belief in consistency, is a continuous/quantitative measure (i.e., it could take on any score in the range of 1 to 7). They simply chose a high and low value to indicate the extremities.

Figure 5. This is taken from Hill, Berthoz, & Frith (2004). Here, all independent variables (again, not strictly independent variables – they reflect natural groupings) are categorical. In this case, we have a 3 (depression category) × 3 (participant group) between-subjects (non-experimental) design.

References

- Baranski, J. V., & Petrusic, W. M. (2003). Adaptive decision processes in perceptual comparisons: Effects of changes in the global difficulty context. *Journal of Experimental Psychology: Human Perception and Performance*, 29, 658-674.
- Bobocel, D. R., Son Hing, L. S., Davey, L. M., Stanley, D. J., & Zanna, M. P. (1998). Justice-based opposition to social policies: Is it genuine? *Journal of Personality and Social Psychology*, 75, 653-669.
- Gabbert, F., Memon, A., Allan, K., & Wright, D. B. (2004). Say it to my face: Examining the effects of socially encountered misinformation. *Legal and Criminological Psychology*, 9, 215-227.
- Henry, J. D., Phillips, L. H., Maylor, E. A., Hosie, J., Milne, A. B., & Meyer, C. (2006). A new conceptualization of alexithymia in the general adult population: implications for research involving older adults. *Journal of Psychosomatic Research*, 60, 535-543.
- Hill, E., Berthoz, S., & Frith, U. (2004). Cognitive processing of own emotions in individuals with Autistic Spectrum Disorder and in their relatives. *Journal of Autism and Developmental Disorders*, 34, 229-235.

Note: Do not consult the above references. They are just where I took examples from.