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## *Assessment guidelines for Assignment 3: A research poster*

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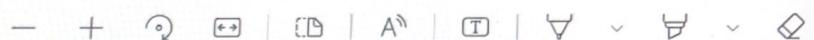
### ***Learning Outcomes***

The goal of Assessment 3—a quantitative report presented in a research poster—is to assess your ability to:

- Identify and describe the appropriate analytical procedures required to evaluate the psychometric properties (internal structure, reliability, and predictive validity) of a scale.
- Apply R to organize and tidy the dataset in order to generate appropriate data visualizations and psychometrics models.
- Apply SPSS to compute linear models testing the predictive validity of predictors on a criterion.
- Inspect the different statistics and mathematical models generated in R (internal structure and reliability) and SPSS (predictive validity) and appraise the outputs to describe and explain the data.
- Organize and display the results using a poster to effectively and concisely assess the psychometric properties of a scale.



 [https://vle.dmu.ac.uk/bbcswebdav/pid-5363090-dt-content-rid-11309771\\_1/courses/PSYC5605\\_2122\\_520/psyc5605\\_A3\\_Guidelin...](https://vle.dmu.ac.uk/bbcswebdav/pid-5363090-dt-content-rid-11309771_1/courses/PSYC5605_2122_520/psyc5605_A3_Guidelin...)



## 1.1 Marking criteria

Assessment 3's learning outcomes are constructively aligned with the learning activities taking place in PSYC5605's *Psychometrics* (Dr Carlos Crivelli) and *Multivariate statistics* (Dr Joanne Faelling) units. Likewise, the systematic alignment of learning outcomes and activities also includes the following aligned marking criteria (**Table 1.1**):

- **Abstract:** Using no more than 200 words, produce a concise, informative, and comprehensive overview covering all main sections (aims, what was done, and what was found).
  - **Test description:** Produce a clear and concise description of the psycho-

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logical test (i.e., description of the purpose of the test, domain, and test classification).

- **Participants:** Produce a clear and concise description of the participants, including the appropriate descriptive statistics in APA format.
- **Exploratory Factor Analysis (EFA):** Identify, describe, and apply—using R—Exploratory Factor Analysis (EFA) to develop a psychological test. Produce an organized and clear account of the steps taken during the EFA, discussing and critically evaluating the findings.
- **Reliability:** Identify, describe, and apply reliability techniques—using R—to a psychological test. Discuss and critically evaluate the findings.
- **Predictive validity:** Identify, describe, and apply—using SPSS—Hierarchical Multiple Regression models to estimate the predictive validity of a group of predictors on a psychological test. Produce an organized and clear account of the steps taken during the estimation of the regression models, discussing and critically evaluating the findings.
- **Conclusion:** Produce a clear and concise conclusive synopsis stating the data analytical techniques used, the key findings, and providing a clear take-home message.
- **Data visualization:** Generate informative and visually attractive visual displays of the results after applying programming skills in R. All figures must be identified (e.g., Figure 5) and referenced in the plots and the main text.
- **Writing style:** Use clarity, conciseness, and coherence to deliver a scientifically sound message.

**TABLE 1.1.** Assessment 3's Marking Criteria Weightings

Criteria	Mark
Abstract	5%
Test description	5%
Participants	5%
EFA	20%
Reliability	20%
Predictive validity	20%
Conclusion	5%
Data visualization	10%
Writing style	10%
Total	100%

### 1.3 Assessment information

In Assignment 3, you will have to produce a poster that will include different sections. In order to successfully complete these sections and pass this coursework, read carefully the marking criteria and the following guidelines:

#### 1.3.1 Abstract

Be brief, but informative. Describe in 5–8 sentences the main goals of the present research, the different stages (EFA, reliability, and predictive validity tests) and your findings. Do not use more than 200 words to summarize the main sections of your poster.

#### 1.3.2 Test description

This brief section is related to the content covered in Chapter 3 (*Scale development*). Which domain is covered by the items (e.g., see Dickman, 1990)? Do you remember the different types of tests (e.g., Classical Test Theory, ability tests, speed tests)? How many items are included in Assignment 3's dataset? How are these items measured? Does the scale include negatively worded items

that would require score reversing? In sum, describe the purpose of the test, domain, and classify the scale using some of the test classifications introduced in Chapter 3.

### **1.3.3 Participants**

The data was generated using structural simulation techniques. Thus, you have to be concise and provide the appropriate descriptive statistics summarizing the demographical information of the *simulated* respondents (*N, age, sex*). Use the appropriate APA formatting style to report the descriptive statistics.

### **1.3.4 Exploratory Factor Analysis (EFA)**

Read Chapter 4 and watch the corresponding screencast. It is important to tidy the data and reverse score negatively worded items before computing the EFA. A brief description of the items supported by the appropriate figure will be a good starting point. Then, factor extraction and factor rotation to discover the simplest structure should provide a clear picture of the internal structure of the test.

Once the EFA results are interpreted and problematic items have been detected (text boxes 3, 3.1, and 3.2), re-run a new EFA without these problematic items (text box 4). Display the path diagrams showing the internal structure of the test before and after dropping the problematic items. Do not forget to interpret and critically evaluate key concepts (e.g., complexity indices, high factor loadings in several factors, unspecified models due to having less than three observed variables per latent variable).

### **1.3.5 Reliability**

Compute reliability tests on your final test, not on the initial items used for the first EFA. Put differently, run your analyses on the reduced scale generated after computing the second EFA.

First, use a nice figure to describe the distribution of items' scores. Then, check the different reliability tests, report them in the main text and figure

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First, use a nice figure to describe the distribution of items' scores. Then, check the different reliability tests, report them in the main text and figure, and discuss their differences (e.g., an overestimation of alpha coefficients when not estimated by factor). If you found that your scale is not unidimensional, subset your dataset by factors and compute alpha coefficients for each factor.

### **1.3.6 Predictive validity**

Dr Joanne Faelling will cover in her unit how to conduct a multiple regression analysis. A hierarchical regression analysis is nothing more than a multiple regression analysis, but computed in two or more sequential steps with nested

models. For a comprehensive approach to multiple regression analysis, please read Andy Field's (2018) chapter 9.

First, you will start with a linear model that will include your scale (use the total score, `impulse`) as the first predictor and `rses` (Rosenberg Self-Esteem Scale) as the second predictor (*model 1*). You will have to test whether these two scales predict the scores of the response/outcome variable (`des`; Dispositional Envy Scale). In a second step (*model 2*), you will add a new variable (`age`) aimed at providing more explanatory power to the initial model. Likewise, you will test whether this new variable added to the previous two predictors is able to predict the scores of the response/outcome variable (`dés`; Dispositional Envy Scale).

### 1.3.7 Conclusion

The conclusion has to be brief, but informative. Summarize what you have done in the poster but just relying on 4–7 sentences. State the data analytical techniques used, the key findings, and provide a clear take-home message for the naive and/or busy reader.

### 1.3.8 Data visualization

Generate informative and visually attractive visual displays of the results. You have to demonstrate that you applied your newly acquired programming skills in R. Customize your figures by adding titles using the argument `main`, changing the appearance (e.g., `col`, `cex`, `stars`, `ylabs`, `method`) and so on. Check the help tab in RStudio and search for the desired function to inspect the arguments and the different options available to change your plots.

All figures must be identified (e.g., Figure 5) and referenced in the plots and the main text. Thus, once you have placed one plot on the poster, add a text box on the upper left side (see the mock poster using the `burnout` dataset as an example). On the other hand, the identified plot (e.g., Figure 5) has to be referenced in the text to easily connect the plots and the text included in the boxes.

**1.3.9 Writing style**

Use clarity, conciseness, and coherence to deliver a scientifically sound message. Avoid waffling, repetition, run-on sentences, and lack of rigor. Use the customary APA formatting style to report test statistics (e.g., test statistics are reported in italics; *r*, *p*, *F*). Check the Psychology Referencing Guidelines and the Reporting Style Guidelines loaded in the Blackboard site for PSYC5605.

## 1.4 Formatting requirements

In Assignment 3's folder (located in *Assessments* → *Assignment 3: Units 4 & 5*), a poster template has been uploaded to guide students. We recommend to use this template because an appropriate organization of the poster's content is key to sequentially display the results and the interpretations of the findings. Notwithstanding, students are free to modify the template (e.g., size of boxes, background color, display of figures), except for the following features:

- Font type: Use only Arial or Times New Roman.
- Font size: Do not use fonts with a size smaller than 18 points.
- Line spacing: Do no use line spacing below 1.
- Figures: All figures have to be identified (e.g., Figure 5) on the upper left side and referred in the text written in the boxes.
- Poster format: The poster that will be submitted to Turnitin has to be a pdf file. Thus, students will need to export their posters as a Portable Document Format (pdf). This pdf file (a *Name\_Surname\_Pnumber\_A3.pdf* file) will be submitted to its corresponding Turnitin link (either on time or after the due date).

## 1.5 Dataset

The dataset is stored in a SPSS file named *impulse\_data\_A3.sav*. The dataset contains 20 variables:

- **id**: Participants' identification number ( $N = 456$ ).
- **sex**: Participants' sex (Male = 1, Female = 2).
- **age**: Participants' age (a ratio scale).
- **i1** to **i14**: A 14-item scale measuring the tendency to behave without self-control (*impulsiveness*). All items were answered using a 5-point Likert scale (strongly disagree, disagree, neutral, agree, and strongly agree). The scale is assumed to be unidimensional (Table 1.2).
- **impulse**: The test total score for *impulsiveness*. The initial pool of 14 items

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- **impulse:** The test total score for *impulsiveness*. The initial pool of 14 items ranges from 14 (extremely low impulsiveness) to 70 (extremely high impulsiveness).
- **rses:** A 10-item scale that measures global self-worth (Rosenberg Self-Esteem Scale; Rosenberg, 1965). All items are answered using a 4-point Likert scale (strongly agree, agree, disagree, strongly disagree). The test total score ranges from 0 (extremely low self-esteem) to 30 (extremely high self-esteem). The scale is assumed to be unidimensional.
- **des:** An 8-item scale that measures individual differences in tendencies

### *1.6 Useful tips*

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to envy (Dispositional Envy Scale; Smith et al., 1999). All items are answered using a 5-point Likert scale (strongly disagree to strongly agree). The test total score ranges from 8 (extremely low dispositional envy) to 45 (extremely high dispositional envy). The scale is assumed to be unidimensional.

**TABLE 1.2.** Items Measuring *Impulsiveness*

Item	Statement
1	I remain calm under pressure
2	I go on binges
3	I know how to cope
4	I panic easily
5	I often get mad
6	I get annoyed easily
7	I easily complain
8	I am relaxed most of the time
9	I become overwhelmed by events
10	I do not lose my temper easily
11	I feel that I am unable to deal with things
12	I get irritated very quickly
13	I am calm in tense situations
14	I get anxious easily

*Note:*

Items 1, 3, 8, 10 and 13 are reversed worded.

Please, note that for some individual items (i.e., i1, i3, i8, i10, and i13) you will have to recode (reverse score) the negatively worded items to con-

- 11 I feel that I am unable to deal with things  
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13 I am calm in tense situations  
14 I get anxious easily
- 

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Items 1, 3, 8, 10 and 13 are reversed worded.

Please, note that for some individual items (i.e., `i1`, `i3`, `i8`, `i10`, and `i13`) you will have to recode (reverse score) the negatively worded items to conduct an Exploratory Factor Analysis (EFA) and to estimate the reliability tests. However, the total test score of these items (`impulse`) has been created to simulate optimal multivariate normal data (e.g., Cholesky decomposition). Consequently, you should only use the variable `impulse` for the hierarchical regression analysis (i.e., predictive validity section).

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## 1.6 Useful tips

- All plots should be exported from RStudio as PDF files. Do not export your plots as images (e.g., png, JPEG, TIFF formats) because they will

be saved into very heavy files that will cause problems when submitting your assignment to Turnitin. Likewise, rescaling these images in the poster will be problematic.

- Be concise, but informative.
- Read carefully this book, study its concepts and practice its applications with the example reproduced in the book and used in the lectures and workshops. Study the materials covered in the lectures, workshops, and screencasts in the units delivered by Drs Crivelli (*Psychometrics*) and Faelling (*Multivariate statistics*).
- Describe your results briefly (they usually stand alone when inspecting the figures), but do not forget to interpret and critically evaluate your findings.
- Contact your lecturer before the deadline to set up a meeting to clarify concepts or to get some help with the code in R. For any technical support (e.g., installation of software), contact the psychology technicians ([psychtech@dmu.ac.uk](mailto:psychtech@dmu.ac.uk)).
- Use the general feedback that Drs Crivelli and Faelling provided for the Assignment 3 in the previous years to avoid past mistakes. You will be able to find the general feedback provided for Assignment 3 in the folder *Assessments → Assignment 3: Units 4 & 5*.

### 1.7 References

- DeVellis, R. F. (2017). *Scale development: Theory and applications* (4th ed.). SAGE.
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