

## METHODS, DESIGN AND RESEARCH TECHNIQUES – Code 800148

Academic Year 2024-25

### COURSE INFORMATION

**Undergraduate Studies:** 0812 – Degree in Psychology (Studies Plan 2009-10)

**Type:** Compulsory

**ECTS:** 6.0

**Module:** Basic training

**Area:** Statistics

**Year:** First

**Semester:** 2

### INSTRUCTOR INFORMATION

**Name:** Miguel Ángel García Pérez

**Mail:** researchmethods@psi.ucm.es

**Office number:** Room 2105-O

**Office hours:** Thursdays, 10:00 to 14:00

### SYNOPSIS

#### COMPETENCIES

##### General competencies

GC6: Know and understand research methods and data analysis techniques.

GC14: Prepare oral and written psychological reports in different areas of activity.

##### Transversal competencies

TC1: Analysis and synthesis.

TC2: Preparation and defence of properly reasoned arguments.

TC3: Problem solving and decision making in Psychology.

TC5: Looking for information and data interpretation on social, scientific and ethical topics related to the field of Psychology.

TC6: Team work and collaboration with other professionals

TC7: Critical thinking and self-analysis.

TC9: Communication skills, learning how to communicate ideas to both, professional and non-professional audiences.

##### Specific competencies

SC17: Be able to measure and obtain relevant data for the evaluation of interventions.

SC18: Know how to analyse and interpret results of evaluations.

SC19: Know how to appropriately and accurately provide feedback to recipients.

### TEACHING ACTIVITIES

#### ECTS BREAK-DOWN

This module is worth 6 ECTS, which implies 150 hours broken down as follows:

- 60 hours for class sessions (40% of the time).
- 75 hours for your own work (50% of the time).
- 15 hours for assessment (10% of the time).

### CLASS SESSIONS

Class attendance is expected and useful for discussions not available elsewhere. I will present the topics in class with the help of slides and you will have copies of these slides (see below). I will also illustrate the concepts and their implications with examples of published research. Practical class sessions generally involve extracting methodological aspects from published research papers and these practicals are interspersed as needed without adherence to the dates and times indicated in the timetable.

## MODULE MATERIALS

A booklet with printed copies of all the slides that I will use in class sessions is available at the copy shop (currently located in the Logopedia building; location may change). I will also post additional materials in the Research Methods site on Campus Virtual along the semester and each new posting will be announced in class.

---

## BRIEF DESCRIPTION:

## PRE-REQUISITES

**Basic proficiency in statistics is convenient to follow the module.** If you need to brush up on your statistics, read Coolican's chapters 12–18 (full reference given below). Consider also J.R. Vokey & S.W. Allen's easy-to-follow *Thinking with Data* (7th edition), which is freely available at <http://people.uleth.ca/~vokey/pdf/thinking.pdf>.

---

## TOPICS

1. Introduction to the scientific method
2. Classification of research
3. The research process
4. Validity of research and bias in research
5. Ethics in research
6. Experimental and ex post facto methods
7. Simulation methods
8. Quasi-experimental methods
9. Non-experimental (correlational) methods
10. Observational and survey methods
11. Single-subject methods and case studies
12. Reporting research results

---

## LEARNING GOALS

All that we think we know about psychology is backed up by empirical evidence gathered in a research study of some type. Would-be research psychologists will eventually contribute to the corpus of psychological literature and they need to know what methods are available to obtain dependable evidence and how each method should be used. On the other hand, would-be applied psychologists will be consumers of scientific literature tasked with putting knowledge into practice and they also need to know what methods were used to obtain the evidence justifying or supporting certain practices and how dependable those methods are. Whichever purpose one has, critical assessment of the way in which some piece of evidence was (or will be) obtained is crucial to progress in basic or applied psychology. Not all available methods are suitable to address any given research question and not all methods allow obtaining conclusive evidence. The main goal of this course is to provide acquaintance with the various research methods available in psychology, the requirements for their use, their inherent limitations, and the factors that threaten the validity of the conclusions a researcher may raise by interpreting the evidence gathered with them. This breaks down into the following learning goals:

1. Learn the main features of scientific psychology and the characteristics of the research process.
2. Learn how to conduct a literature search on any topic in psychology.
3. Become acquainted with the major classes of research methods in psychology.
4. Learn key issues in psychological research: Hypotheses vs. expectations, variables and their roles, types of design, control methods, etc.
5. Become acquainted with the concept of research validity and its facets: internal validity, external validity, construct validity, and statistical conclusion validity.

6. Become aware of the ethical aspects of psychological research.
7. Get acquainted with current conventions for the reporting of research results.

By the end of the semester you should be able to understand all the methodological details provided in research papers published in psychology journals, which will allow you to assess the dependability of the conclusions raised in them. When you gain (in other courses) in-depth knowledge about specific areas of psychology within your field of interest, the skills you have developed in this course will allow you to design suitable studies to address relevant research questions.

---

## ASSESSMENT

---

Module grades arise from two sources: a final exam and a project that you will complete over the semester.

### Final exam

An open-note exam will be administered at the end of the semester. The exam will consist of a practical exercise in which you will answer methodological questions about a published paper that will also be provided. Some answered exams from previous years are available in the Research Methods site on Campus Virtual. **You may bring to the exam around 10 hand-written sheets including whatever you think you will need as a reference to answer those questions.** You **must** bring a picture ID as proof of identity. The exam earns you a maximum of 7 points. A minimum score of 3 points on the exam is necessary (but not sufficient) to pass this module.

You should keep in mind that successfully answering the questions in the exam requires that you have developed skills to identify and interpret methodological aspects of the research reported in a published paper. You cannot possibly acquire such skills over a few crash study sessions right before the exam, and simply memorizing definitions of variables, types of design, etc., will not help you either. Continued work throughout the semester is essential to develop those skills, which you will also have the opportunity to exercise during practicals and with the scheduled analyses and discussions of mandatory readings in the Research Methods site on Campus Virtual.

### Project

You will also be evaluated on the basis of a project that you will carry out throughout the semester. This activity earns you a maximum of 3 points, although some simple projects will not earn you that maximum. You may decide to carry out your project individually or in a team with other classmates, but I will impose limits on the size of each team according to the project you choose to carry out. I am open to hearing about proposals of any suitable type but, in principle, you have a choice among:

- a) Literature search. You will compile a list of papers or other documents published on a topic of your choice during the last 5–10 years. For your search, you must use *Web of Science*, *PsycINFO*, and *Google Scholar*. Your report should at least include a classification of this literature that distinguishes theoretical papers, research papers, reviews, etc. You will also identify key methodological aspects in each research paper and, ideally, report major controversies in theoretical or experimental approaches as well as hot issues in current research on that topic.
- b) Bibliometric analysis. You will analyze all the papers published on a given calendar year in a specific journal (e.g., *Psychonomic Bulletin & Review* or *Psychological Science*), with an eye towards classifying the papers primarily according to the type of research and type of design that were used but also according to other categories. Your report must include a summary table listing the characteristics of each paper according to the criteria.

c) Methodological analysis of a published research paper. This project implies work that is thoroughly analogous to what you will have to do in the final exam. You will pick a published paper and analyze it from a methodological point of view. Besides descriptive aspects (type of research, variables involved, design, etc.), you should consider and discuss validity issues, ethical issues, and reporting issues (including the extent to which the paper provides sufficient information for replication). To give you an idea of what this type of analysis implies, some sample reports are available in the Research Methods site on Campus Virtual along with the published paper that they relate to; I will upload other reports of the same type during the semester.

For a project of this type, you may pick a paper of your own choice (e.g., one you had to read for other modules or one on a topic you are interested in), but you will have to show it to me to ensure that it is appropriate; alternatively, you may pick a paper from the list that will be available in the Research Methods site on Campus Virtual shortly after the beginning of the semester. I have already checked the papers on that list for appropriateness and the maximum score attainable with each of them is indicated on the list. To pick a paper from this list send me email to the address given above, indicating your choice of paper and the list of team members (if applicable). I will get back to you to tell you whether or not that paper is still available and whether the size of the team is adequate. Papers on this list will be assigned on a first-come first-serve basis.

Individuals or teams **must discuss their project choice with me during the week that starts on February 10th, at the latest.** I will understand that you refuse to carry out a project if I do not hear from you by February 17th. You need my approval for the size of the team and I will tell you the maximum score attainable with your choice of project before giving you the go signal. You must then brief me on your progress regularly during the semester so I can monitor your work and assess your performance. This communication must take place in person; email is not suitable for this purpose. There is no pre-established number of meetings that we should hold as this depends on the pace of your progress, but this series of meetings should start early in the semester as soon as you begin to work on your project. **Without this regular interaction, I will understand that you have given up on the project and, thus, it will not be graded.** I will ask you questions and give you feedback and guidance during our meetings, but you cannot expect me to provide you with the answers that you actually have to find. For instance, if your project is of type c), I will often tell you which questions you have to find the answer for and I will also tell you what parts of the paper you have to read more carefully to find them. Guidance for planning and conducting your project is available in the Research Methods site on Campus Virtual. **The written report of your project is due on May 16th.** A tool will be made available in due time for you to upload it to the Research Methods site on Campus Virtual.

### **Final module grade**

Your final module grade will be based on the sum of the points earned on the exam (a maximum of 7) and the points earned on your project (a maximum of 3). If your score on the exam is at least 3 points, grades will be assigned according to your sum score (ranging from 0 to 10) on the following scale:

[0–5): Suspenso (S)

[5–7): Aprobado (AP)

[7–9): Notable (NT)

[9–10]: Sobresaliente (SB)

No passing grade is required on the project, but note that you will receive a failing grade (S) if you do not earn at least 3 points on the exam regardless of your score on the project. Note also that you will not get a grade beyond NT if you do not carry out a project.

If you do not pass the module in May, there will be a resit examination in June but there is not a second chance for a project. However, if your project was graded but you did not get the maximum score that was possible on it, you have the option to improve your written report and upload a new version by the time of the resit.

### Plagiarism and cheating

Plagiarism or cheating are breaches of academic integrity and are penalized. Cheating on the final exam results in dismissal from the exam and an automatic failing grade on the module. The penalty for copying word for word or cutting and pasting material from other sources into your written report is to fail the assignment, with no consequences on your score on the exam.

## RESOURCES

### Textbooks and resources

There is no set text, but almost all textbooks on Research Methods (in Psychology, in the Behavioral Sciences, ...) cover the module topics adequately. The following books and resources are all available in the library (or free to download or access on the web). In my taste, Goodwin's is your best pick as a reference book.

- Breakwell, G.M., Hammond, S. & Fife-Schaw, C. (1995). *Research Methods in Psychology*. Thousand Oaks, CA: Sage.
- Coolican, H. (1990). *Research Methods and Statistics in Psychology*. London, UK: Hodder & Stoughton.
- Cozby, P.C. & Bates, S.C. (2018). *Methods in Behavioral Research*, 13th edition. New York: McGraw-Hill.
- Jhangiani, R.S., Chiang, I-C.A., Cuttler, C. & Leighton, D.C. (2019). *Research Methods in Psychology*, 4th ed. <https://kpu.pressbooks.pub/psychmethods4e>
- Goodwin, C.J. (2010). *Research in Psychology. Methods and Design*, 6th edition. Hoboken, NJ: Wiley.
- McGuigan, F.J. (1983). *Experimental Psychology: Methods of Research*, 4th edition. Englewood Cliffs, NJ: Prentice-Hall.
- Schweigert, W.A. (2012). *Research Methods in Psychology. A Handbook*, 3rd edition. Long Grove, IL: Waveland.

The following table lists chapters in each book that cover each of the module topics:

	Goodwin	Jhangiani et al.	McGuigan	Schweigert	Breakwell et al.	Cozby & Bates	Coolican
Introduction to the scientific method	ch. 1	ch. 1 & 2	ch. 1–5	ch. 1	ch. 2–3	ch. 1 & 2	ch. 1–5
Classification of research	ch. 3						
The research process				ch. 3 & 4			
Validity of research and bias in research	ch. 5–6			ch. 5			ch. 4 & 14
Ethics in research	ch. 2	ch. 3		ch. 2		ch. 3	ch. 20
Experimental and <i>ex post facto</i> methods	ch. 5–8	ch. 5	ch. 6–8 & 10–11	ch. 6 & 7	ch. 5	ch. 8–10	ch. 6 & 10
Simulation methods							
Quasi-experimental methods	ch. 10	ch.8	ch. 13	ch. 8	ch. 7	ch. 11	
Non-experimental (correlational) methods	ch. 9	ch. 6 & 7	ch. 9	ch. 9		ch. 11	
Observational and survey methods	ch. 12			ch. 10 & 11	ch. 12 & 14	ch. 6 & 7	ch. 7–9
Single-subject methods and case studies	ch. 11	ch. 10	ch. 12	ch. 12 & 13	ch. 6	ch. 11	
Reporting research results	App. A	ch. 11	App. B	App. C		App. A	App. 1

Additionally, freely available textbook-like online materials can be found at

- <https://nobaproject.com/browse-content>
- <https://www.bmj.com/about-bmj/resources-readers/publications/epidemiology-uninitiated>
- <http://www.socialresearchmethods.net/kb/contents.php>
- <https://himmelfarb.gwu.edu/tutorials/studydesign101>

Beware of some contradictory statements in these sources when compared to one another or to my own on a number of categories, topics, definitions, etc. I cannot possibly list them all here, if only because of the regular additions and revisions made to the material in these online sources. If conflicting statements puzzle you, do not hesitate to ask me about them.