
The research report

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Recommended minimum time required: 6 hours



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Index

| | |
|--------------------------------------------------------------------------------------------------|----|
| Introduction | 5 |
| 1. Collection and organisation of data | 7 |
| 1.1. Systematisation of procedures | 7 |
| 1.2. Confidentiality and anonymisation | 7 |
| 1.3. Data quality | 8 |
| 1.4. Qualitative and quantitative information: implications for the analysis | 11 |
| 1.5. Coding | 13 |
| 2. Obtaining evidence | 17 |
| 2.1. Introduction to data analysis | 17 |
| 2.1.1. Exploring the data | 17 |
| 2.1.2. Descriptions and associations | 20 |
| 2.1.3. Causal inference and inference to the population: internal and external validity | 22 |
| 2.2. Quantitative data analysis | 25 |
| 2.2.1. Descriptive statistics | 25 |
| 2.2.2. Inferential statistics | 26 |
| 2.3. Qualitative data analysis | 28 |
| 3. Evaluation and presentation of the evidence | 30 |
| 3.1. Evaluation of the outcomes of the educational intervention | 30 |
| 3.2. Presentation of the outcomes of the educational intervention | 31 |
| 4. Preparation of the final report | 33 |
| 4.1. Structure and content of the research report | 33 |
| 4.1.1. Title and summary | 33 |
| 4.1.2. Introduction | 37 |
| 4.1.3. Method | 43 |
| 4.1.4. Results | 53 |
| 4.1.5. Discussion | 58 |
| 4.1.6. Bibliography | 61 |
| 4.1.7. Annexes | 61 |
| 5. Ethical and formal aspects | 63 |
| Bibliography | 65 |

Introduction

The parts of this module are structured by basically taking into account two conceptual blocks. The first is focused on considerations related to the execution of a research project, often in the form of an intervention and, more specifically, with respect to the data that this intervention will have generated and what they will have to become as an outcome measure. These data should be considered as evidence of the degree or magnitude to which the intervention will have reached its objectives. On this point, the conceptual and applied considerations necessary to understand what is being referred to when talking about data, and specifically quality data, will be presented which, once properly organised and processed, will eventually become information.

The second block will be aimed at the preparation of a research report. The structure that it must take and the contents of its sections and subsections will be presented. This second part will be accompanied by examples, recommendations and practical guidance. The research report must be understood as a scientific tool of great relevance; not only because it forces the researcher to become familiar with a set of rules and conventions that are common in the scientific world and helps them to learn how to select, structure and summarise what is more relevant concerning a problem or a relevant research question, but also because the research report becomes a communication tool between the researcher and the rest of the community with whom certain scientific objectives are shared.

1. Collection and organisation of data

Obtaining sufficient data is not an automatic process that arises spontaneously from the administration of a set of measures or directly from the observation of a phenomenon. In this section the necessary procedures will be presented for obtaining relevant data, knowing how to interpret the quality of these data, and also the basic differences that can be found between the research carried out from a qualitative and quantitative paradigm. The section will also address the important process of coding, a strategy whereby a datum is converted into the value of a variable of relevance that, once organised among itself and with other variables by means of certain strategies, can then be subjected to analysis and become substantial information. All this must be done by also ensuring that the necessary considerations are maintained so that participants in your study are guaranteed their right to have their data under certain quality standards.

1.1. Systematisation of procedures

Turning a certain outcome into evidence of whether certain research has worked a little or a lot occurs, most of the time, due to having to apply systematic data collection procedures. This involves applying an assessment protocol that is applied to all study participants and responds to a work plan that is uniform worldwide, and that is clear and known *a priori*. These are the basic ingredients that allow replicability not only, as previously stated, between the various participants but also among professionals, where necessary. In addition, this systematisation must be accompanied by the use of assessment tools that meet certain quality guarantees, generally operationalised in the form of psychometric or usability criteria that should also be known, shared and accepted by a particular community of researchers.

1.2. Confidentiality and anonymisation

Maintaining confidentiality and ensuring, therefore, the anonymisation of the people participating in your study, as well as the data obtained, should be considered a fundamental requirement of any research process.

When talking about maintaining confidentiality, this refers to that situation where only the members of a research team are those who know the identity of all participants. The participant therefore remains anonymous. In addition, it must be ensured that it is not possible to easily find out or infer the identity of a participant, even if no explicit data has been collected in this regard. Sometimes you have to be quite creative to obtain it. Keep in mind that even if a data matrix does not contain explicit data, such as names, surnames, tele-

phone numbers or addresses, the merging of certain data about a participant can make that person potentially identifiable. You must always be committed to maintaining a high degree of control.

Ensuring the confidentiality of data has become an issue of great importance nowadays. In fact, it has become a critical element and a reason for great discussion and controversy, typical of the historic times we are living in, where the mechanisms that generate and capture data of all kinds, the capacity to store, process and, above all, how to make use of the data, are forging ahead at an unprecedented speed.

Social networks, artificial intelligence, *big data*, etc. are continually bringing this issue to the table. What strategies can be applied to increase the degree of confidentiality of your study? Some considerations that may be useful:

- Preferably use identification codes for participants and avoid nominal ones, both in terms of paper and digital formats. The majority of the time, in research, it is not relevant to obtain names, surnames, telephone numbers, addresses, etc., therefore avoid collecting this data. In other words, anonymise them. A good strategy is to code people with numbers and generate a second file in which the number generated and the person (with their name and surname, or ID number, for example) are connected and, therefore, you can access it when necessary. This second file should only be accessible to the principal investigators.
- In the case of paper documents, remove the sheets or those parts with identifiers.
- It might be an idea to destroy any paper or digital documents or files belonging to projects that have already concluded. The data should be deleted when they are no longer useful.
- Try to store any information on paper in a secure space (locked with a key, restricted access, for example). If the document is digital, enter a password to access it.

Deleting files

We are aware of the reluctance that can be held when it comes to deleting files. The law can protect you. Check if the terms where the law does apply fit your situation, as well as the time-scales you have to adhere to whereby a piece of information must be kept before it is destroyed.

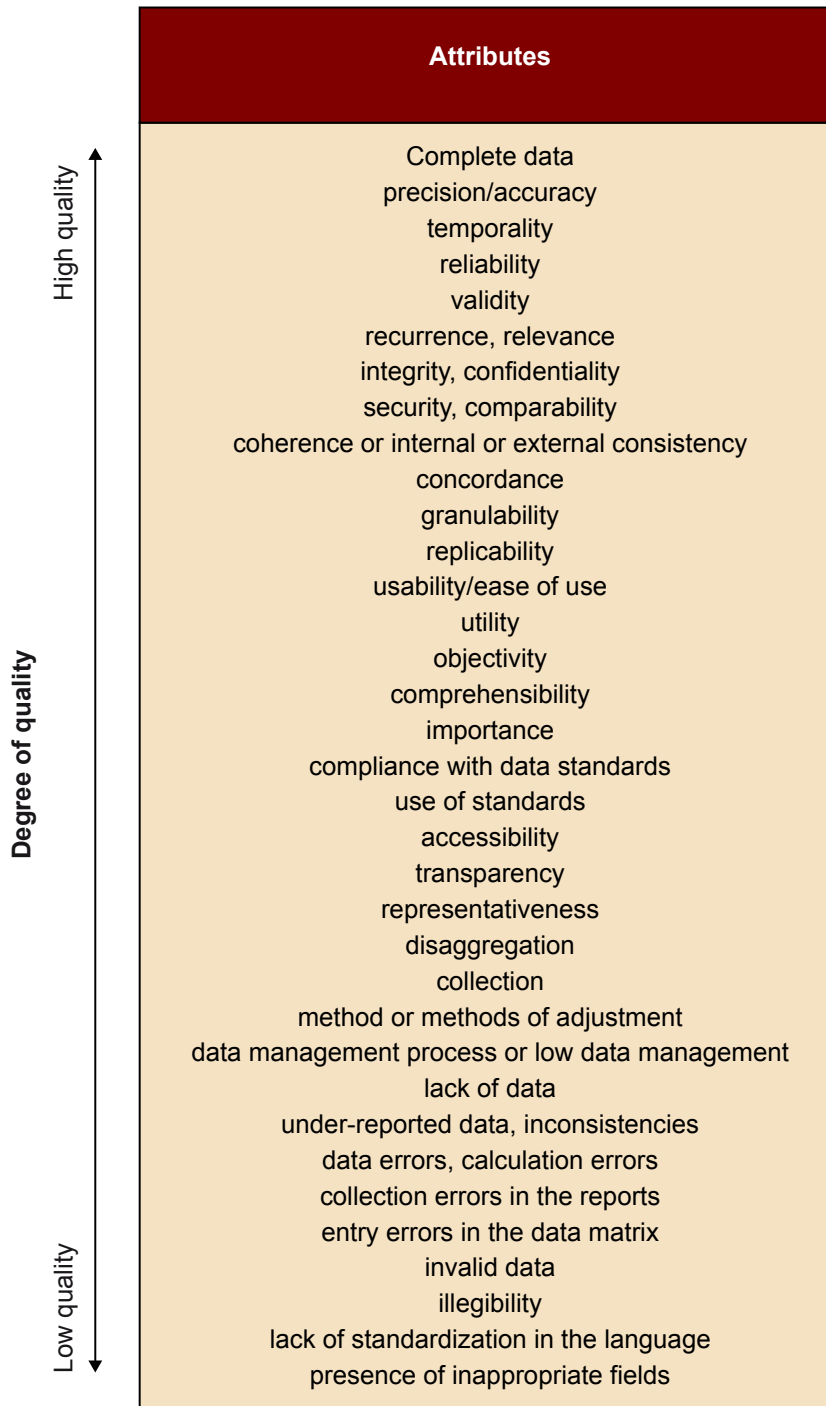
Stop a moment to think about how many different places you have the same file: your work computer; the laptop that you carry everywhere; a portable memory that you use every now and then; in the cloud of various applications that you use for this type of resource; probably also on your mobile or tablet; within both your professional and personal email addresses, etc. Anything you do will neither be absolutely safe nor definitive in this digital world, and you already know that. Reduce, however, the impact of a poorly anonymised file.

1.3. Data quality

In the field of health, relevant efforts have been made to systematise the attributes that determine or narrow down the concept of quality when referring to data. Although we are looking at an educational context, it is believed that the terms that enable the definition of data quality in the field of health also can be (should be) applicable to the educational field.

It is interesting, then, to be able to carefully read about the attributes that are usually used in the field of health, since we will obtain a fairly accurate picture of how the concept of quality refers to given data (see table 1).

Table 1. Data attributes and the degree of quality



This set of attributes allows us to recognise the degree of quality that we find in descending order, from the most desirable levels to the lowest and most undesirable levels of quality. In order to offer a description and organisation

of the indicators that protect the quality of the collected data, Cai and Zhu (2015) formulate, in table 2, how they are organised and how some of these key indicators can be described:

Table 2. Data quality indicators

| The data... | | |
|--------------|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Availability | Accessibility | <ul style="list-style-type: none"> • ... have been obtained through strategies that are known. • ... can be made public or are easy to obtain. |
| | Temporality | <ul style="list-style-type: none"> • ... they maintain a temporary link with the planned intervention. |
| Usability | Credibility | <ul style="list-style-type: none"> • ... they have been monitored, their content verified, they have been corrected if necessary. • ... they respond to possible values within the expected or assumable range. |
| Reliability | Precision | <ul style="list-style-type: none"> • ... they are exact. • ... they reflect the real values of the information source. • ... they do not create ambiguity. |
| | Consistency | <ul style="list-style-type: none"> • ... for a certain time they are still replicable and verifiable. • ... when they come from different sources, they are convergent. |
| | Integrity | <ul style="list-style-type: none"> • ... they have a clear format and meet the baseline criteria. • ... they are consistent with the structure and content of the concept to be evaluated. |
| | Completeness | <ul style="list-style-type: none"> • ... they are available and enable the demand generated to be included. |
| Relevance | Adjustment | <ul style="list-style-type: none"> • ... they possibly do not cover the whole concept of interest, but they focus on a relevant aspect of it. |

Source: adapted from Cai and Zhu (2015)

| The data... | | |
|-------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Quality | Readability | <ul style="list-style-type: none"> • ... they have a content that is clear and understandable. • ... they provide a description, classification and coding that will meet the anticipated needs. |

Source: adapted from Cai and Zhu (2015)

1.4. Qualitative and quantitative information: implications for the analysis

The disjunction between qualitative and quantitative research is common in research. Manuals, methodological strategies, even clearly segregated university departments seem to justify and perpetuate this now classic disjunction in the field of research. Both approaches have actively constructed and established the idea that they are two paradigmatic ways of viewing the world and that, moreover, they are highly antagonistic. It is often considered that qualitative evidence is excessively open to subjectivity, while others consider that quantitative evidence is excessively definite and limited and should not be used without taking into account other forms of evidence, including the opinions or points of view of the people evaluated as well as those who are carrying out the research.

From this module, it can be stated that both types of research should be seen as strategies that should work together, rather than in isolation or separately. In addition, it must be added that we believe that it must be like this.

However, given that this section does not intend to find a harmonious symbiosis between both types of research, the basic features that characterise one paradigm and the other will be described in a very condensed form. Table 3 shows the main differential elements of the two approaches. Later in this manual, you will find all the details that determine each approach.

Table 3. Discrepancies between qualitative and quantitative paradigms

| Point of view | Qualitative paradigm | Quantitative paradigm |
|---------------|--------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|
| Conceptual | Focused on understanding human behaviour from the perspective of whoever contributes this information. | Focused on the discovery of factors about the social phenomenon. |
| | It assumes a dynamic and negotiated reality. | It assumes a fixed and measurable reality. |

Source: adapted from Minichiello *et al.* (1990)

| Point of view | Qualitative paradigm | Quantitative paradigm |
|----------------|---------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| Methodological | The data is collected by a participant observer and via interviews. | The data is collected by measuring things. |
| | The data is analysed per issue, which derive from the informants' descriptions. | The data is analysed by numerical comparisons and statistical inference. |
| | The data is reported in the informant's language. | The data is reported through a statistical analysis. |

Source: adapted from Minichiello *et al.* (1990)

Qualitative research is especially useful in contexts where the individual factor, the person evaluated, becomes the most relevant concept. What this or these people think or feel is clearly a necessity. From this perspective it is understood that psychological or educational research is something that happens and makes sense in a specific social context, and that the researcher's objectivity cannot be applied. It is a methodology that has a strong position in the world of sociological and political research, social work and also extensively in educational research.

Qualitative data is usually obtained in the context of focus groups, case studies or participant observations. Although a structured interview (so frequent in quantitative research) can also be used, most of the time qualitative data is obtained from a semi-structured interview and, especially, from an unstructured or open interview. Other ways of obtaining data within this paradigm can include photographs or images, public or official documents, personal documents or historical variables (Taylor and Bogman, 2014).

Qualitative research, and in particular the analytical approach that accompanies it, has often been described as tedious, due to the large amount of information that often does not have a common or simple structure and the codification processes that often give meaning to its analytical process. However, this complexity of analysis has been substantially simplified nowadays thanks to the use of specialised software and computers with great processing capabilities. We cannot fail to mention, however, that within the same qualitative methodology there is fierce criticism towards the widespread use of computational strategies to handle qualitative data. This criticism is not so much because the use of a computer, *per se*, has to be an inconvenience, but that this methodological approach, closer to the quantitative work approach, tends to eliminate the human interpretative factor, an element that has classically characterised this paradigm. And it is necessary to understand that a qualitative methodology is not a unitary or uniform entity, but that different approaches coexist, which conditions the differences of derived analytical approaches, to the point that some can oppose each other (Guba and Lincoln, 2005).

Although you can learn more about the different approaches that coexist within a qualitative framework later on, in the first chapter of the text by Creswell (2007) you can get to know the various great approaches that are found within a qualitative methodology. A quantitative methodology has been identified as a form of empirical and systematic research, interested in observable phenomena that employs statistical, mathematical and computational techniques on a large scale (Given, 2008). Although qualitative research understands that the information produced exclusively affects the people who were studied, a quantitative methodology assumes that its inferences can be used more widely or projected onto people who were not included in the study sample thanks to the application of inferential-type strategies. This concept will be expanded upon later.

1.5. Coding

Coding involves applying an analytical (or conceptual) process in which data, of whatever nature and condition, becomes a new system. And this new system is what allows the new data to now be processable, in accordance with a set of considerations and strategies that the researcher will deploy.

The coding process can be set up via two well-differentiated approaches depending on whether we are talking about a qualitative or quantitative methodology. In the qualitative case, the first consideration that must be assumed is that a large amount of text will have been generated. Most likely, what has been recorded in an observation procedure, interview, via notes, audio or video recording, etc. has been transcribed as text.

When faced with a transcription, the strategy that is often used is the identification of the concepts or categories that, once collected in a coded manner, will become the key elements of the process (Ritchie, 2003). These encodings will constitute the basic units of analysis for successive operations. In a next step of analysis, this coded material is organised into new higher-level categories that are often identified as issues, which will allow the researcher to handle more manageable material. This new material can be organised according to its relevance and it will subsequently be interrelated and interpreted in accordance with a pre-established theoretical framework. This is the general outline of the coding process from a qualitative paradigm, although the details of the procedures can be diverse according to the format or nature of the text that will be processed and, of course, the qualitative approach in which we find ourselves.

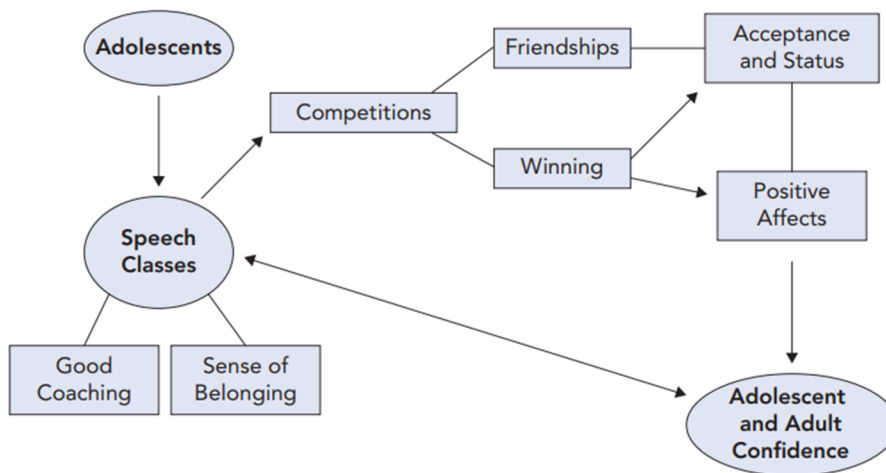
There are two methodological tools that can be found within the qualitative paradigm and that can allow us to inspect the basic working material. These are matrices and networks. Choosing one or the other will basically depend on what should be evaluated: a chronology of events, the behaviour of a group of people under different roles, the interrelation between variables, etc.

1) **Matrices.** Matrices are essentially an organised structure that arises from the crossing of several rows with several rows and columns. Some variables are found in the rows and others are found in the columns. The key system information will be found at the intersection of the two entities. Let's imagine that you want to implement a new organisational and pedagogical project in a school. In the rows you could put the considerations or the point of view of the various stakeholders that have been involved in the project's development (1: management, 2: tutors, 3: teachers, 4: students...). In the columns you could put the various spaces or resources in which the project has had an impact (1: content of the subjects, 2: teaching plans, 3: physical space of the classrooms, etc.). Within each box certain results will be determined such as, for example, the main issues that have arisen after having conducted several group interviews. In addition, if desired, the observations or evaluations that the researcher makes of each element could be incorporated into the matrix, as an additional evaluative element of the system. The type and degree of specificity of the information collected will obviously depend on the researcher's criteria and the research project's objectives. The results of this matrix will eventually be discussed depending on a certain theoretical positioning.

2) **Networks.** In the case of networks, a collection of nodes will appear that interconnect several concepts, for example, actions by people, events or processes. Its basic function is to provide a visual image of the relevant factors that have been considered and the interrelationships that are established between them. This outline will act as a support for the narrative work that the researcher will end up creating. You have an example in figure 1.

Figure 1. Example of a qualitative methodology network

A Network Model of "Lifelong Impact" From High School Speech Participation



Source: Miles *et al.* (2014)

To provide more descriptive capacity in the network, the researcher will be able to incorporate elements with differentiated roles. Thus, for example, different functions can be granted to each concept depending on whether squares or circles are used for each one, or explaining the unidirectionality or bidirectionality of an effect according to the direction of an arrow. In the text by Miles *et al.* (2014) you will find the details of these and other representational strategies.

In the case of a quantitative methodology, the strategy followed consists of obtaining data from the measures applied, most of the time from structured or semi-structured interviews or questionnaires and scales, or sometimes from generally systematic observation. The data are then entered into a data matrix, comparable in structure to the one that has already been mentioned in the case of a qualitative methodology, but in which you will generally find variables of interest arranged in the columns and participants in the rows. The intersection of one thing and another will generate a set of boxes where you will find the value that each participant presents for each of the variables. You have to make sure that the values that are collected from each variable for each participant are set to the same format (figure 2).

Figure 2. Example of a data matrix from a quantitative perspective

| | A | B | C | D | E | F | G |
|----|----------------|------------|---------------|--------------|---------------|------------------|-------------------|
| 1 | subject | age | gender | group | school | level_pre | level_post |
| 2 | 1 | 4 | 1 | a | tuxent1 | 34.8 | 37.8 |
| 3 | 2 | 3 | 1 | a | ponsa1 | 22.7 | 29 |
| 4 | 3 | 4 | 2 | a | tuxent1 | 12.9 | 22.4 |
| 5 | 4 | 4 | 1 | a | tuxent2 | | |
| 6 | 5 | 5 | 1 | a | ponsa1 | 23.5 | 28.5 |
| 7 | 6 | 4 | 2 | a | ponsa1 | 20.1 | 25 |
| 8 | 7 | 6 | 1 | a | ponsa1 | 20.9 | 22.7 |
| 9 | 8 | 5 | 2 | b | tuxent1 | 11.7 | |
| 10 | 9 | 4 | 2 | b | ponsa2 | | |
| 11 | 10 | 3 | 2 | b | tuxent1 | 21.2 | 23.3 |
| 12 | 11 | 4 | 1 | b | tuxent2 | 76.1 | 75.4 |
| 13 | 12 | 5 | 1 | b | ponsa1 | 43 | 44.7 |
| 14 | 13 | 3 | 2 | b | ponsa2 | 29.1 | 29.6 |
| 15 | 14 | 5 | 2 | b | ponsa1 | 76 | 76.7 |

Source: own creation

The structure of this matrix allows the vast majority of approaches from a quantitative perspective to be operationalised, since it will be possible to directly carry out a series of strategies or analysis techniques that should be able to answer the questions posed. An Excel sheet, for example, is specifically designed to provide a matrix like the one seen in the last figure.

2. Obtaining evidence

At this time you have the data prepared to address it from an analytical point of view. This section addresses the analysis phase of the collected data. The need to make a first approximation of the analytical process will be highlighted by paying attention to the profile of the project's relevant variables, presenting the techniques and strategies that are usually used in this phase of work. Next, the key concept of the relationship between the variables will be addressed, which will require having to present the difference between association and causation. At this point, and from a quantitative perspective, it will be explained as to what it means to make statistical inference by addressing, albeit loosely, the statistical tests that are most commonly used, without forgetting the key concept of statistical significance. In the case of a qualitative methodology, the phases that usually characterise this approach will also be presented in general terms.

2.1. Introduction to data analysis

2.1.1. Exploring the data

Before starting to perform any analysis to answer your research questions, explore your data. Whether you are talking about qualitative or quantitative data, carefully examine what you have. It is recommended that your first step should be to explore each of the values that your variables take, all those that will be of interest in resolving your questions. Provide a description of frequencies, i.e. explore how many people take each of the possible values of the same variable. The objective must have a dual purpose. First, and most importantly now, detect inappropriate values, i.e. values that are impossible or values that are very unlikely. The objective in this phase is that you can refine them, if necessary. Search among the primary sources, in the paper copies you used to record the data from the interviews or questionnaires. If it is an error, you have to correct it. If the value is exceptional, but correct, the decision is not usually simple. There are often people who present extreme values in some quantitative variables, either because they are very high or because they are very low. You must assess the magnitude of the extreme value and, very importantly, the impact it has on the set of values in the same variable. Calculate the mean and standard deviation of the exceptional value variable. Recalculate the two estimators without the exceptional value. Are there substantial changes? If the answer is no (in large samples of subjects this is what usually happens), what you have is probably a value that you will not have to question. If the answer is yes, you will have to find a solution. Sometimes it is not just one or two exceptional values, but a variable that has a distribution with some skewness. One option may be to transform the data into a new dis-

Trimmed mean

One possibility is that you calculate trimmed means, i.e. means in which an extreme value has been excluded. The result can be compared with what comes from an untrimmed mean.

Transforming variables

Search, for example, *data transformation (statistics)* on Wikipedia. Each possible solution depends on each specific problem.

tribution of values in which the impact of this exceptional value is lower. In the network you will find all the possible options according to the type of distribution that you must address. Sometimes it may be useful to use statistical procedures that minimise the impact of these anomalous values (for example, procedures based on median values, rather than means). In other cases it may be appropriate to dispense with the value and exclude it from the analysis.

Explore the presence of missing values. It is very likely that there are one or more variables. Are many values missing in a single variable? What happened? Have you forgotten to collect or enter the data for a group of participants? Was it not applicable to many participants? Are you compromising some of the study objectives?

The second strategy, which is linked to the first, is to explore your data with graphics, either by providing a visual support for the most analytical exploration (when you did it only with frequencies, means, deviations...), or directly by providing a holistic perspective of the behaviour of your variables. That well-known principle that states an image is worth more than a thousand words applies here. Ask your software (for example, in Excel) to generate box plots or histograms (figures 3 and 4). They are two very useful graphic resources for analysing this first approximation of the data. They will allow you to quickly figure out how the quantitative variables behave. In the case of qualitative variables, use, for example, bar charts (Figure 5), thus describing the behaviour of each of the categories of these variables.

Figure 3. Box plot

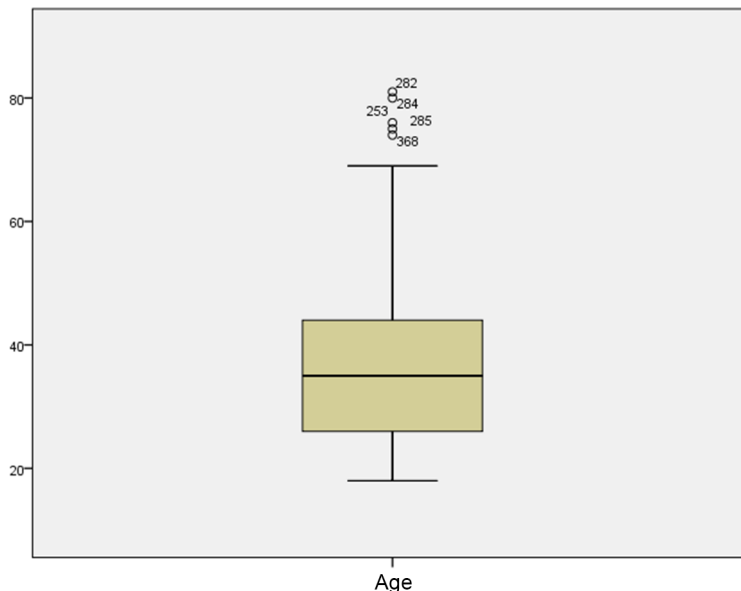


Figure 4. Histogram graph

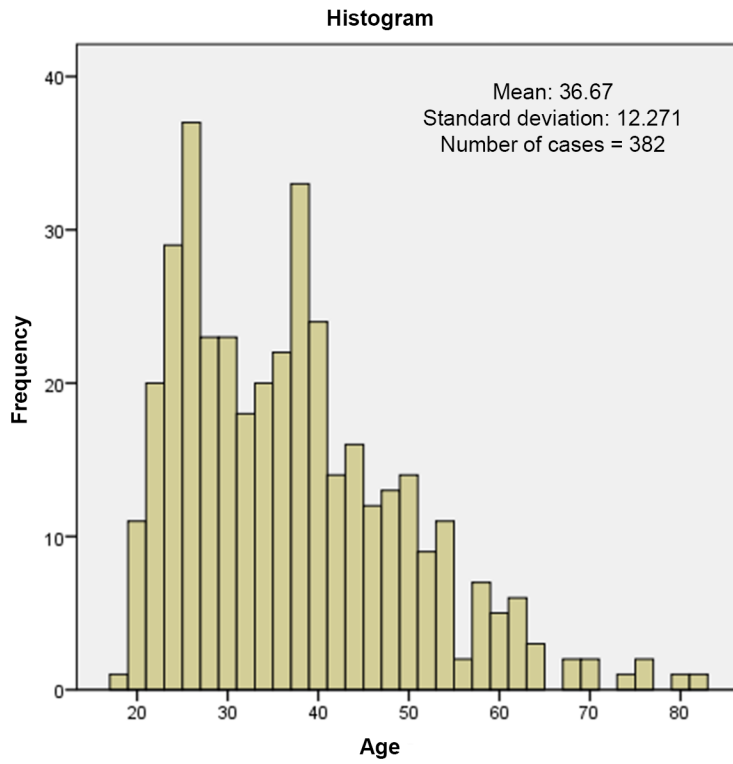
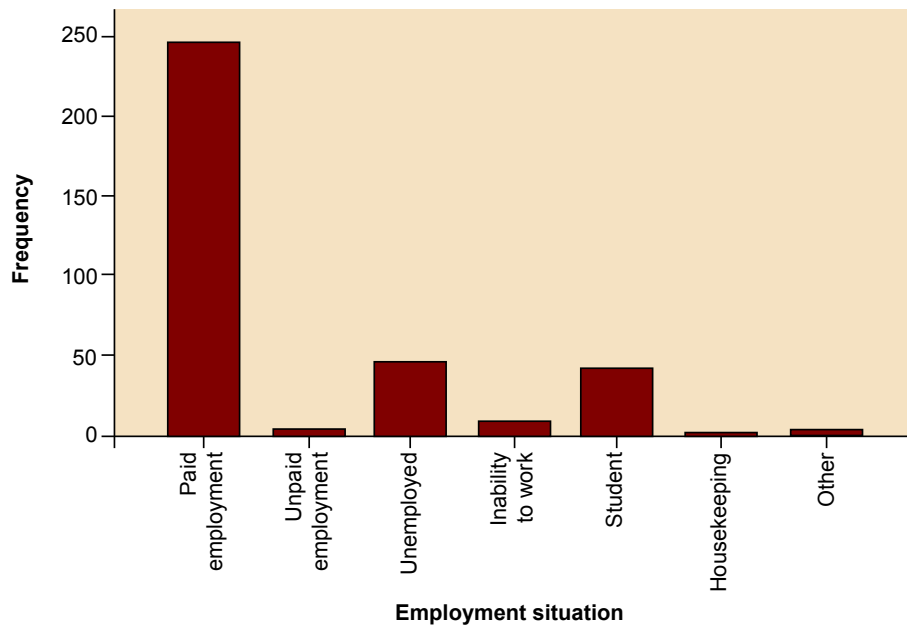


Figure 5. Bar chart



Remember: despite the temptation to start analysing the data immediately to see if it corroborates the questions that are posed, look at it carefully. Get a first impression of how it looks and how the data is distributed, explore if it presents exceptions, make decisions about whether to refine it one way or another. Forget about universal solutions or formulae. Each situation requires a specific approach. If you have doubts, seek advice.

What would happen if...

... you are interested in determining the role of the age of a group of students in the performance of an intervention on reading speed. You have spent hours analysing the data and you have written up most of the results. You begin to create the tables for your report to describe the main variables and observe, with astonishment, that you have included a participant aged less than three years in the analyses. You have not dedicated any time looking at the distribution of the "age" variable.

2.1.2. Descriptions and associations

The process described above has already provided you with an exploratory foundation for the data. You will now need to provide descriptors of your data, assuming that you are no longer in an exploration phase.

You need to provide the best descriptors of the data assuming that they will be incorporated into your report.

The most common way to report a quantitative variable is with a mean. However, you must bear in mind that it will not always be the most appropriate resource. It could be that the median (the core value in a set of values) is the one that best describes your data, especially when you have to describe variables that have a distribution that moves away from normal distributions (also known as a Gaussian curve or Gaussian bell curve). The result would be a skewed distribution like the one mentioned a few paragraphs before. There are statistical tests that enable the analysis of variables with these distributions.

Take the previous indices of any estimator that allows you to describe how different the participants are. The standard deviation is usually the most common. In the case of variables with categories, create percentages. If your objectives include comparing two or more groups, provide this stratified information for each of the groups. In figure 6 you will find all these elements: for the quantitative variables, such as age or years of schooling you will find the means (M , in the second part of the table) and their corresponding standards or deviations; for qualitative variables, such as gender or employment status, the percentages. All this, in addition, for each of the interest groups, in this case, three groups of participants.

Figure 6. Example of results table

Table 2
Participants' characteristics.

| Variables | ADHD (<i>n</i> = 589) <i>n</i> (%) | Clinical (<i>n</i> = 138) <i>n</i> (%) | Community (<i>n</i> = 98) <i>n</i> (%) | <i>p</i> |
|-------------------------|----------------------------------------|--------------------------------------------|--------------------------------------------|----------|
| Gender | | | | <0.005 |
| Male | 394 (66.89) | 86 (62.32) | 48(48.98) | |
| Female | 195 (33.11) | 52 (37.68) | 50(51.02) | |
| Employment | | | | 0.035 |
| Unemployed | 117 (19.86) | 30 (21.73) | 15 (15.30) | |
| Working | 378 (64.17) | 95 (68.84) | 64 (65.30) | |
| Studying | 90 (15.38) | 10(7.41) | 12(13.19) | |
| ADHD subtype | | | | |
| Inattentive | 214(36.33) | - | - | |
| Hyperactive | 38(6.45) | - | - | |
| Combined | 337(57.22) | - | - | |
| Other disorders | | | | <0.001 |
| Presence | 303 (51.44) | 59 (42.75) | 22 (22.44) | |
| Absence | 286 (48.55) | 79 (52.24) | 76 (77.51) | |
| Type of other disorders | | | | |
| Mood disorders | 246 (41.76) | 53 (38.40) | 20 (20.41) | <0.001 |
| Anxiety disorders | 237 (40.24) | 47 (34.06) | 18 (18.37) | <0.001 |
| SUD | 252 (42.78) | 41 (29.71) | 18 (18.37) | <0.001 |
| Personality disorders | 146 (24.78) | 20 (14.49) | 6 (6.12) | 0.150 |
| | M (SD) | M (SD) | M (SD) | p |
| Age | 32.89 (10.55) | 34.83 (11.38) | 38.65 (13.00) | <0.001 |
| Years education | 11.58 (6.26) | 11.72 (4.42) | 14.04 (4.22) | <0.001 |
| WURS | 50.67 (17.44) | 36.71 (18.82) | 20.85 (15.62) | <0.001 |
| Rating scale | 30.52 (9.66) | 16.19 (8.92) | 6.91 n6.06) | <0.001 |

Source: extracted from Vidal *et al.* (2014). Note: you can use the format of this table (without lines between internal boxes, etc.) as a prototype model. It is the most common in scientific journals.

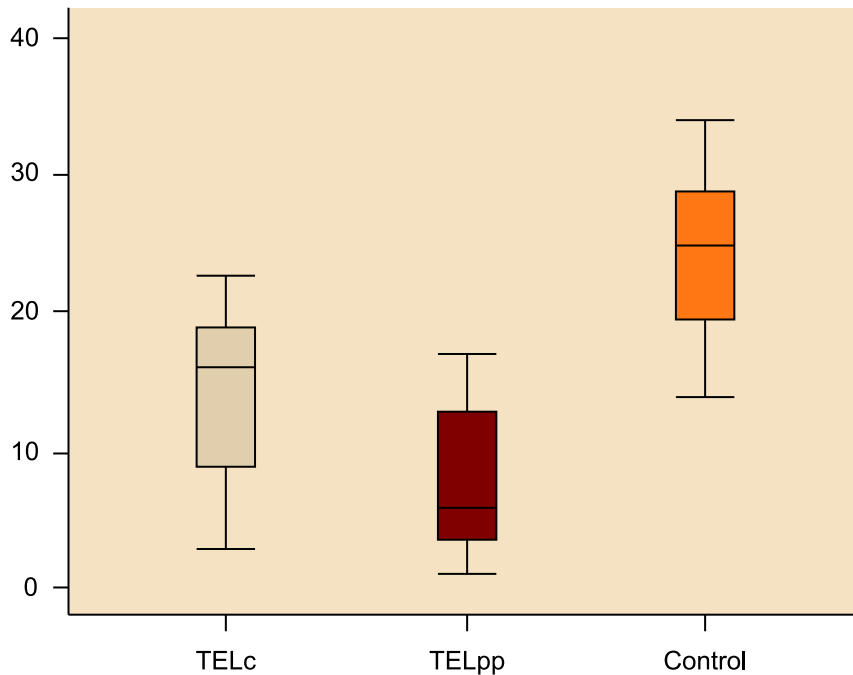
At this point, and also taking advantage of figure 6, let's look at the presence of women. As can be seen, although in the first two groups of participants they represent around one third of the sample, 33% and 38%, in the third they amount to 51% of the participants. Therefore, it does not seem that men and women are evenly distributed between the groups. In other words, it could be said that the gender of the participants is related to the type of intervention (which in this study is the main independent variable of the study).

Let's change the study and look at figure 7. Without going into the details of the research, what you are interested in here is to see that there are three groups of participants (horizontal axis), which justifies the three box plots. The amount of sentences that include each other can be observed on the vertical axis. Note that the box of the third group, identified as *control*, appears displaced upwards, while in the case of group participants *intermediate* (TELpp) their box is located in the lower part of the graph. In other words, the controls are those that record more phrases; the TELpp, the least. Can it be stated that a relationship is established between the two variables, the group and the number of sentences? Yes it would seem.

Box plot

In the box plots the continuous black line inside the box is the median, i.e. the value that leaves half of the participants above and the other half below it. It should not be confused with the mean.

Figure 7. Example of a box plot



Source: extracted from Roqueta *et al.* (2010)

Generally speaking, when can you state that there is a relationship between two variables? When the values taken by the first tend to be associated with different values in the second, since you find with an indicator that both variables may be related.

2.1.3. Causal inference and inference to the population: internal and external validity

Talking about the validity of research means basically talking about two main axes, regardless of the nature of the research, its objectives or how it has been carried out. Let's talk about internal and external validity. Any research is always blessed with a certain degree of validity of one type or another.

They are two dimensional properties. This implies that, rather than talking about research that does or does not have validity, it will be necessary to understand them as two properties that are always held to a certain degree. The task entrusted to the researcher will be to determine if each of them is appropriate for assuming that the research project has sufficient guarantees.

Internal validity

In order to properly speak of internal validity we need to address a previous, fundamental aspect, which is that of the identification of the independent variables (IV) and the dependent variables of a study (DV). Let's start with the latter.

The DVs are those that are defined by the outcome of a research study. They enable us, for example, to determine whether or not there has been success in an intervention. So, if what you want to determine is whether an intervention in the classroom based on the use of certain software (with its two conditions: that a group of students use it and another do not) improves the academic performance at the end of a course of a group of schoolchildren, the outcome variable will be performance. This is the DV. What is the IV? It is that or those variables where the researcher expects the DV to present one value or another. From the previous example, this entails the intervention with the software with its two different groups. This is the standard schema that is established between IV and DV: from the various conditions of the IV it is expected that the DV will present different values.

It is evident that when planning an intervention you expect that the differences observed throughout the different conditions or categories of the IV will be most evident. In the event that there is no significant difference between the different IV conditions, it will be necessary to assume that the intervention has had a null effect: the groups configured to evaluate the intervention obtain equal or comparable results. Now, if you observe that the various groups that you have foreseen present substantial differences in the DV, can you state that these differences are due to the effects of the IV? Or, in other words, can you say that the IV is the cause of the DV?

This question now links up with the concept of internal validity. We will state that a study presents more internal validity to the extent that this research allows us to determine that the IV is the cause of the DV. However, what criteria can you base it upon? Classically there are three criteria that are usually used to discern the degree of internal validity of a research study:

- 1) The cause precedes the effect in time: the determination of the conditions of the IV is prior to obtaining the DV.
- 2) The cause and effect are related (covariation): the DV presents discrepancies throughout the various conditions of the IV.
- 3) There are no plausible alternative explanations for the observed covariation.

The last one is the most complex consideration to address, since it involves having knowledge of a certain depth not only of the theoretical, educational, clinical considerations, etc. that frame our subject of study, but also, and in a particular way, the methodological and design aspects that have determined our study. The control exercised over the conditions of study must be discussed and, therefore, the degree of manipulation that researchers have exercised over the circumstances of the research. It would be necessary to refresh some of the fundamental concepts of research methods that have been addressed at another time. However, and generally speaking, you must not lose sight of the fact that the higher the degree of manipulation exercised on the IV, the less space you leave for alternative explanations beyond those derived from the manipulation of this IV. Accordingly, it will be perceived that the way in which the participants have been assigned to the conditions of study, to the conditions of the IV, is a main element of the reasoning. In other words, if you have deployed your intervention under an experimental type design, the degree of control exercised will be greater than what you would obtain by applying a quasi-experimental one. You will have given less opportunity for other factors, unrelated to the intervention, to become either consistent or sufficient explanations that reduce the capacity of causation to the IV over the DV. Each study requires a specific approach, but this general perspective is useful.

External validity

The second form of validity that must be evaluated is external validity. And to speak of external validity is to speak of representativeness and, more specifically, its capacity for being used more widely. When you design a research study, you rarely propose it assuming that the results obtained will be exclusively extrapolated to the participants themselves. Generally what is intended is to be able to infer a consistent conclusion not only with respect to the people who are part of their sample, but, especially with respect to people who are not part of it, but who are comparable to the participants. Regarding internal validity, we know that the way we assign participants is fundamental. In the case of external validity, what is key is how they are selected. Although in the case of the assignment it was interesting to be able to randomly execute an assignment (if possible), in the case of external validity the key is the selection strategy, i.e. how the participants of the study are chosen. Being able to also do it in a random way is a desirable element. Inasmuch as the participants in your sample become a random part of the population that you will end up referring to in your results, you will have more external validity. In Rodríguez-Osuna (1993) you will find a compilation of the various types of existing sampling methods and practical examples.

The reality of the research, however, usually emerges with many difficulties. Despite the goodness of the random selection of the participants, the probability of being able to perform a probabilistic sampling method, i.e. randomly and directly on the target population, is usually slim in standard research.

What would happen if...

... you observe that between the IV and the DV a very intense relationship is established, evidenced, for example, by a high correlation? Could you say that causation is established between the two variables? If no other information is available, beyond what is derived from the test or the statistical result, the answer must be no. Two variables may be related, but this does not mean that one is the cause of the other. The relationship is a necessary condition in the causation, but not sufficient.

Most of the time you will have to accept a sampling method of convenience, i.e. a sampling method based on the inclusion of people who are accessible to you: those that you can reach thanks to your workplace, those who live in your district, the students you serve in one way or another, those who agree to participate, etc. This circumstance will imply that, when judging the external validity of a research study, you have to do it based on the knowledge you have of the participants who are eventually included in the study and in accordance with the scope that you want to give to the conclusions of the research, rather than using generalist arguments about the advantages and limitations typically associated with each type of sampling method. We will return to the issue of sample generalisation in the subsection dealing with participants of the research report.

2.2. Quantitative data analysis

2.2.1. Descriptive statistics

Elsewhere in the module we have talked about means, medians, typical deviations or proportions and percentages as essential indices to describe the behaviour of a variable. Evidently there are other indices that should be known to try to analyse the study to the fullest extent. Table 4 will allow you to establish the statistical indices that most commonly end up being needed.

Table 4. Most common statistical indices

| | | |
|-----------------|----------------|------------------------------------------------------------------|
| Mean | Median | Standard deviation |
| Variance | Standard error | Sum |
| Minimum-maximum | Range | Lower 95% confidence limit / upper 95% confidence limit (CI 95%) |
| Percentile | Quartiles | z score |
| Percentage | Proportion | Missing value |
| Skewness | Kurtosis | |

Source: own creation

If you have any doubts about any of these values, check them. You will find the definitions in the network. Beyond the statistical resources aimed at the description of specific variables, statistics also offer huge resources for the determination of the relationship between variables. And that is a key element of a research project, to determine if some variables are related to others. It is a fundamental element of a quantitative methodology.

In the same way as in the most purely descriptive case, there are statistical procedures, known as statistical tests, which are more commonly used. You should be familiar with these tests (table 5). Keep in mind that we will deal with the most common basic techniques in more detail later.

Table 5. Statistical tests

| Strategy | Theoretical | Example | Statistical test |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| Correlation | Relationship between two quantitative variables | Amount of approved subjects and level of intelligence | r |
| Chi squared | Relationship between two qualitative variables | Employment status of the mother (working or not working) and the student achieving basic competence in mathematics at six years (yes or no) | χ^2 |
| Mean comparison | Relationship between a dichotomous qualitative variable and a quantitative variable (independent groups) Relationship between a dichotomous qualitative variable and a quantitative variable (paired groups) | End of term school grades (0-7) and student's gender (girl or boy) End of term school grades (0-7) and computerised intervention (before and after) | T |
| Analysis of the variance | Relationship between a qualitative polytomous variable and a quantitative variable (independent groups) Relationship between a qualitative polytomous variable and a quantitative variable (paired groups) | End of term school grades (0-7) and computerised intervention (simple, with drawings or sounds) End of term school grades (0-7) and computerised intervention (simple and with drawings and sounds) | F |

Source: own creation

Each statistic is based on a specific rational and empirical specificity. However, the final operational conclusion you are able to reach is common: is there or is there no relationship between the two variables (statistically speaking)?

2.2.2. Inferential statistics

We have just seen what basic statistical techniques are available when we talk about the concept of the relationship between two variables. What you need to know now is that the essential function of these techniques is to be able to discern how much difference should be assumed to determine whether it can be said that there is a relationship between two variables. For example, in the case of figure 6, 33% were women in the first group, while in the third group they were 51%. If the first group remained as it is but the third group dropped to 41% of women, would you maintain the claim that there is a relationship between the two variables? With 51% yes, but with 41% no? The question that is derived is obvious: from when could you not state it? Here the inferential statistics come into play and that gives meaning to the statistical techniques that have been presented to you.

What would happen if...

... in the examples that are represented in figure 6 (relationship between gender and intervention group) and in figure 7 (group explored and number of sentences remembered) would you have to choose a statistical test? What would it be for each case?

According to Miograd (2010), statistical inference is talked about when referring to a set of strategies that allow the researcher to make judgements based on particular observations of a sample with respect to a general case. Basically, it consists of estimating the characteristics or properties of a population based on the analysis of a sample that, it is assumed, has been extracted from this population. Inferential statistics enable us to ask questions about this reference population, and these questions become hypotheses that can be subjected to a statistical analysis, obtaining a result that will either confirm or refute this hypothesis.

This acceptance or refutation, however, will be derived from the application of an analytical strategy or another that will respond to different paradigmatic approaches. We can talk, among others, about paradigms like Bayesian or frequentist inference, for example (Bandyopadhyay and Forster, 2011). In this manual we will focus on the frequentist paradigm, which today remains the most widespread analytical framework as an inferential mechanism.

From the frequentist perspective, it is assumed that the sample that is evaluated, and that is the only sample that you have, becomes one of the many (infinite) samples that could have been obtained at random from the target population. The aim is to quantify the exceptionality of a characteristic observed in this sample according to what would always hypothetically be expected if these numerous samples had been executed. Knowing the degree to which a trait is more or less exceptional is possible when the distribution of a given statistic is known. The researcher's task is to select the statistic that can best represent the characteristic to be evaluated, or, in other terms, choose the statistic that has a distribution that allows better modelling of the characteristic to be tested (F, T, Chi squared, etc.).

In the example that was discussed in figure 6, the question that would be asked would be connected with the fact of having to estimate the probability of finding the gender differences that we have found among the three intervention groups. In other words, to determine to what extent you are facing an exceptionality or not. If you are faced with something that is exceptional it is because it is rare: this is unlikely to happen. And if it's rare, maybe it should grab our attention. This is one of the foundations of statistical inference from the point of view of the frequentist perspective.

The way in which this exceptionality is quantified is through the p value. A probability value that allows you to quantify the probability of an event with a set of assumptions. Or, more specifically, a value that allows you to determine if the result of a parameter observed in a sample, contrasted with the known distribution of a statistic (always acting as a reference model), exceeds or not a certain threshold that has been established in an arbitrary way. The result of this judgement may be given in terms of a null hypothesis, if the threshold is not exceeded, or an alternative hypothesis, if it is exceeded. This formulation

in terms of statistical hypotheses is what allows us to state, finally, whether the variables that are the subject of interest are related or not (alternative or null hypothesis, respectively).

With the aim of promoting communication among researchers in the education or health sciences, a 5% threshold is usually used, i.e. a fact is considered uncommon when this is associated with a probability of occurrence that is lower than this percentage. Hence, an effect (a correlation between two variables, a comparison between two groups, etc.) is considered statistically significant when it is accompanied by a p value that is lower than this, which is usually expressed as $p < 0.05$.

2.3. Qualitative data analysis

As it has been mentioned before, a basic step of a qualitative methodology is to codify the concepts that have been considered relevant to the study. A second step will be to try to make sense of the evidence collected. This linearity between facts, however, will not always be evident, since the interpretation that is made of a concept often ends up influencing or conditioning the type of analytical approach that will be deployed.

In any case, it should be assumed that making sense of the data is linked, at least partially, to the method that is followed to order and categorise the data. This implies that, when talking about a qualitative methodology, we are not only talking about the strategies and techniques that are used, but also about the intellectual processes that are developed. Chapter 9 of the book by Ritchie and Lewis (2003) will allow you to learn more about the underlying analytical processes.

Qualitative data, understood as that obtained by applying a qualitative methodology, can come, as we know, from various sources (interviews, audios, observation, etc.). Although the analytical strategies that can be deployed to analyse the data generated can be diverse, the general procedure that is most commonly used will be described again here. Although the basic processes that are involved have already been mentioned throughout this text, Table 6 schematises these elements by presenting the six fundamental phases that describe the analytical process and the expected outcome for each one (Braun and Clarke, 2006).

Table 6. Procedural phases of a qualitative methodology

| Phase | Method | Results |
|-------|---------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|
| 1 | The data is read and re-read in order to become familiar with it, especially when faced with the presence of possible patterns. | Define possible initial codes and make detailed notes. |

Source: adapted from Braun and Clarke (2006)

| Phase | Method | Results |
|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| 2 | The initial codes are generated and documented where and how the patterns are produced. The researcher groups data into levels, which allows them to create categories for a more efficient analysis. The categories created must have conceptual relevance. | Create comprehensive categories linked to the questions that motivate the research. |
| 3 | Codes are combined into higher-level factors that become issues, which must be duly described by the researcher. | Make a list of candidate issues for subsequent analyses. |
| 4 | The researcher should be able to see how the issues support the data and the theory upon which it is based. If this analysis is considered incomplete, you need to return to previous phases and detect what has not been considered. | Recognise the coherence of the generated issues and the capacities they have to explain the data. |
| 5 | The researcher must define what each issue consists of, what aspects of the data have been collected by each issue and what is relevant to each issue. | Carry out a comprehensive analysis of how the issues contribute towards understanding of the data. |
| 6 | A report is drawn up ordering the issues depending on their relevance in the description of the data. | Describe the results. |

Source: adapted from Braun and Clarke (2006)

As already mentioned, the use of strategies that are more typical of a quantitative paradigm may be common in some qualitative approaches. One of these approaches is called *content analysis*. Within this context of work it is often common to carry out a quantification of the concepts obtained after applying a coding procedure such as one that has already been mentioned. Thus, under this framework, the researcher can apply standard statistical procedures, such as the calculation of proportions or correlations, for example, with the aim of being able to visualize consistent patterns among the data (Roberts, 2000). In other cases, this content analysis will not be executed on the basis of quantitative strategies, but on strictly qualitative foundations, evidently in keeping with the most classic approach of this paradigm.

3. Evaluation and presentation of the evidence

This section basically consists of a set of observations, but above all, recommendations on how to proceed when selecting the evidence that should be part of your assessment protocol and that should reveal the success of your intervention. As brief a section as that is, the elementary considerations that should be taken into account when presenting this evidence to the scientific community are presented in a very condensed form.

3.1. Evaluation of the outcomes of the educational intervention

As has already been said, if what motivates your search is the evaluation of an intervention, it will be necessary to determine which indicators will be used to operationalise the effectiveness criterion.

We believe that we have not discovered anything new if we state that there is no measure that is absolutely valid and reliable. One of the most important tasks that you will have to solve is finding the measures that offer good guarantees in one sense and in another. For this reason you will need to search the literature for studies with comparable objectives.

If the measures you will apply are psychometric (interview, scale, questionnaire, etc.), look for a version that is adapted to the language of the participants. If you do not find an adaptation, try to find another one that has been adapted. Avoid using measures without (good) quality indicators in your culture as much as possible, specifically in the language in which your participants are competent. Adapting a measure, knowing that this will mean going beyond interpreting the questions, can intrinsically be a research objective. However, try to avoid mixing the adaptation of a measure with its use as an indicator of the outcome of an intervention. You will be conditioning the resolution of the second objective to achieve good results in the first. It is risky since it requires a design and significant investment of resources to achieve both.

If you have several measures that could be candidates for measuring the outcome of an intervention, try to choose only those that are most relevant. Sometimes the feeling of wanting to have everything collated is an invite to incorporating many variables. Note that if you have several measures, you will have to analyse them all, and that will force you to have to handle a large number of outcomes that will not always be convergent or easy to discuss later. Choose only the measures that join together more guarantees in the literature and that at the same time are appropriately adjusted to your needs. Most

often one or two will be enough. Carefully analyse the connection between the questions you raise in the project and the outcomes that can be derived from the measures you have chosen. Incorporating more measures than strictly necessary, in addition to considerations in terms of professional cost and conceptual relevance, also means that participants (children, parents, teachers, etc.) have to invest more time and effort to resolve your protocol.

If the chosen outcome, combined or not with a psychometric one, is behavioural or observational (discussion groups, behavioural records or any other type, etc.), you have to make sure that you can have these elements available whenever you need them. Forming a discussion group, for example, involves having an adequate space and specifying a timeline, with a schedule that suits you all. Being interested in the end-of-course grades of a group of children, another possible outcome variable, obliges you to agree upon *a priori* the data collection with the school. You have to make sure that once you finish the course, or the term, you can have it. You should also consider how to manage the format of this data (not all schools grade the same), how you will send it (as it is confidential), etc. Note that schools have their work dynamics and rhythm, and that, in addition to yours, they usually participate in other research projects throughout the course. You have to foresee the logistics and limitations that may arise.

Another aspect that must be taken into consideration when choosing evidence is its impact in terms of being used more widely. One thing is that the available sample is smaller, which already becomes an intrinsic limitation when it comes to extrapolating the results. Another is the degree of increased use that your measure offers. Make sure that it can be extrapolated to other groups of people, that it can be easily implemented by other schools, that it does not carry a high cost, etc. Note the opportunity offered by the project to facilitate that others can do things similar to those you have done, especially if the outcomes have been successful.

Last but not least, do not forget the effort and expectations of the participants in the study. Think about it too and assess the possibility of reciprocity: have you considered the possibility of explaining your results to the people involved?

3.2. Presentation of the outcomes of the educational intervention

The basic function that a report must fulfil is to communicate a research project. And this function has, at least, two aspects. One, to allow the dissemination of knowledge; the other, to allow other researchers to replicate your findings.

As you will see below, the report will be the main tool that will let you know what you have done and the results that come out of it. You will see that the language that is usually used in the writing of the document follows some fairly cross-disciplinary guidelines between studies. And it is that when one is talking about scientific communication, the concern for the way of communicating becomes an element of great relevance.

To delve into the details of the formalisms that are usually expected in the writing of a scientific or academic document you can consult the texts by Bailey (2005), Montgomery (2003) and Pycszak (2005), but although it seems obvious, the best resource is to have a read through enough scientific publications. Regarding the way in which the tables and figures of the report should be presented, you will find examples when the parts of the report are presented in the following section.

In addition to the concern for the purely formal aspects of scientific communication, other aspects that will have to be ensured will have to do with the reproducibility of the method used in your research. Bear in mind that the degree of formalism that is required at the time of writing a document of a scientific nature does not stop being a desire to achieve a discourse that is comparable among researchers; that everyone uses similar forms of communication with the aim being that everyone ends up understanding comparable things. At this point, however, you would be talking about standardisation in the methods, in the methodological procedures. This is one of the (what could be stated as inseparable) goals of scientific discourse. Being able to properly ensure the reproducibility of a sample, procedure, or evaluation of a resource, is a task that must be well managed by the researcher. And the best tool that can be available is the clarity and conciseness with which each of the decisions is reported and the steps that the researcher has undertaken in their project. The description of section 5 delves into this idea. You must provide the maximum information, while always keeping it relevant as to how an intervention has been developed, what the collected measures are and what outcomes are obtained. The opportunity must be provided for others to do the same and perhaps not reach the same conclusions.

4. Preparation of the final report

In the following sections we will explain what the structure of a final research report should be, the contents that are usually expected from each section and the corresponding subsections. There are some examples drawn from published documents and some practical recommendations. The outline of the report that will be explained to you here corresponds, basically, to that of a scientific article. However, bear in mind that, although it is generally a field of literature where the wording is fairly standardised, there is no single and universal way to do it. Just think that each journal can impose its own style when it comes to accepting a job. Obviously we will not go into each of these details, but we will try to offer an explanation regarding the most common perspective. To reinforce this learning the text by Pyrczak (2005) is recommended. It will provide you with a structured perspective of each section and examples of each concept.

Do not forget that the report will be one of the best tools you will have to convince readers about the quality and relevance of your research project. You will need to know how to search, summarise and present in detail everything that gives meaning and relevance to the project. Given that, as has already been described, the writing of a research report can rarely be justified in the form of an open and free-style text, you will need to master the formalisms that usually characterise this field of scientific publication.

4.1. Structure and content of the research report

4.1.1. Title and summary

In general, a lot of time is usually invested in thinking about and writing the body of the report (method, results and discussion), but very little in thinking about the title and the summary of the document. We tend to perceive that these sections are minor aspects or secondary elements, especially afterwards, as already stated, compared to the time and effort devoted to the rest of the tasks in the report. This bias, however, can be enormously counter-productive given that the title and summary are the calling card of your project. Note that the title and summary are the elements that will play a key role in inviting your potential readers to read (or reject) your document. For this reason we have arranged them under the same heading.

The title and the summary are fundamental elements in the communicability of the research that you want to make known, since they actively contribute towards the dissemination capacity of a document, which is also a key element of any scientific communication process.

Of course, the content, the quality of the research design and the impact of its results are relevant, but the relevance of a search will also be perceived from the beginning. You could consider that, especially with respect to the title and the summary, things “must be”, but they must also appear. In this respect, two considerations must be taken into account with regard to both elements:

- The title and the summary are usually the only elements that appear on the web pages of the documentary sources. If you want to read the rest of the content, you usually have to access more specific spaces on the internet. In addition, they are also usually the only accessible contents of the entire document in the case of documentary sources with restricted access, that is, those that require some type of subscription or payment.
- The title and, above all, the summary, are the elements that will be commonly used as screening factors, i.e. they will be the first elements that an editor, or a person who has been entrusted with the task of selecting projects, will read at the time of granting or not granting help or when determining whether it is worthwhile to continue reading the project.

There are no universal guidelines on how to prepare a title and a summary, but the first step must essentially be to know if there are editorial criteria or other criteria when you prepare your proposal. You will have to determine what considerations should be protected, both in terms of structure and length, when you draft the report. Each university department, publisher, journal, etc. can have their own criteria. It is better to check them beforehand.

The title of a report must be able to gather together the essence of the project it heads. It must be clear, unambiguous; it should try to explain everything that happens in a very limited space. When creating the title of your project, you should bear in mind some of the key elements of the project that you want to publicise. These main elements can be narrowed down by answering the following questions:

- What is the project about?
- What design does it follow? What techniques does it apply?
- Which people have participated in it?

- What are the most relevant outcomes?

It is not necessary that each and every one of the elements deriving from these questions are presented in a title, but you can take them as a good reference when formulating it. Think, for example, of a report entitled “An experience of an intervention in dyslexia”. This title does not say anything substantial. It is too general. But if it was entitled “The effect of virtual reality on increasing reading speed in dyslexia”, it provides a substantial title, and it is also very informative regarding the project it represents, although it does not provide (explicit) information about the results. Another simpler strategy is to focus attention on the independent and dependent variables. A good example of this type of title would be “Physical activity as a facilitator of reading comprehension”. If you have more than one independent variable, you will have to look for the concept that best encompasses the set of these independent variables so as not to fill the title with an excessive number of words.

The summary of the research report should also be brief, although not as much as a title obviously. Likewise, it should be very comprehensive and should review all the basics of the research carried out. The first consideration that should be made about this section is about when it should be written: it should be done at the end. The summary should end once the rest of the sections have been written. The reason seems obvious: we must know what has been worked on so far and on what terms in order to extract an appropriate summary. When efforts have been made to decide and include the main and secondary elements of the introduction, method, outcomes and conclusions within each section, it will certainly be much easier to condense everything and give body to the summary.

The second consideration has to do with its structure. You could propose three different ways of creating a summary. The first, which tends to be more common in social sciences and humanities, generally means that no specific schema is imposed. It has a free structure, and the contents, its form or length, depend on the judgement of the author, which will give more or less relevance to one aspect or another as it suits you. Regarding the second and third forms, however, the structure has a standard layout, so these are recommended. They are comparable with each other insofar as they involve having to collect information about the background (part of what will be identified as an introduction later), the objectives, the method used and the outcome with the conclusions that are derived from them. Each section requires its space in the text. See example 1 published by Roqueta and Clemente (2010). Keep in mind that the letters in parentheses are added.

Example 1

“(a) A large number of subjects with specific language impairment (SLI) manifest communicative and pragmatic problems. This study aimed to analyse the role of mentalistic comprehension tasks in distinguishing an SLI profile with predominantly pragmatic problems. (b) To this end, the execution in mentalistic tasks of a group of participants with conventional SLI was compared with ($n = 11$) a group with SLI with greater pragmat-

Title length

What length should a good title have? As Pyrczak (2005) notes, in a random selection of one hundred and fifty-two articles on mathematics education, the average number of words he observed that were part of the title was eleven. We are not aiming to establish a norm, because there is none, but here we have a point of reference.

ic involvement ($n = 9$) and a group with typical language development ($n = 13$) among ages between four and seven years. (c) The results revealed that all groups were equally capable of attributing mental states when the context is structured. However, subjects with pragmatic SLI were less successful than the conventional SLI group when the tasks were communicatively oriented and needed to process non-explicit context information. (d) Our data supports the possibility of isolating a subtype of SLI with special pragmatic problems, as well as the use of mentalistic tasks to more accurately assess these difficulties”.

Regarding the difference between structures two and three of writing, it must be taken into account that, in the case of the last model, each section must be preceded by its homonymous title, usually in bold, which creates the appearance of a more structured summary. See example 2 extracted from Staels and Broeck (2017):

Example 2

“**Objective:** Recently, a general implicit sequence learning deficit was proposed as an underlying cause of dyslexia. This new hypothesis was investigated in the present study by including a number of methodological improvements [...]. **Method:** In a 2×2 within-subjects design 4 tasks were administered in 30 dyslexic and 38 control children: an implicit and explicit serial reaction time (RT) task and an implicit and explicit contextual cueing task. [...] **Results:** The amount of implicit learning was similar for both groups. However, the dyslexic group showed slower RTs throughout the entire task. This group difference reduced and became non-significant after controlling for attentional functioning [...] **Conclusions:** Dyslexic children do not suffer from a specific implicit sequence learning deficit. The slower RTs of the dyslexic children throughout the entire implicit sequence learning process are caused by their comorbid attention problems and overall slowness”.

Note that, regardless of whether we are in scenario two or three, the problem statement should be as condensed as possible. One sentence is enough. Some summaries are written by starting directly with a presentation of the problem, avoiding any theoretical framework or background. This involves a more direct approximation and also does not become null and void. See example 3 of Díaz-Herrero *et al.* (2010):

Example 3

“The objective of this study was to analyse the psychometric properties of the Spanish version of the *parenting stress index-short form*. After translating the tool using the translation procedure (English-Spanish) and back-translation (Spanish-English), it was administered to a sample of one hundred and twenty-nine mothers of children aged between ten and thirty-nine months. The exploratory factor analysis identified two factors: stress derived from child care and personal discomfort, which explained the 48.77% of the variance. The internal consistency of these factors was high (stress derived from child care: 0.90; personal discomfort: 0.87). The implications of these findings are discussed and suggestions for future research are given”.

The last consideration about the summary has to do with its length. If you do not have any prior information that conditions the length of the text, you can take the range of 150-250 words as a reference. This is the length that many journals demand.

4.1.2. Introduction

The introduction is the part of a research report that enables us to learn the context. It introduces the area of knowledge, goes into the details of the problem that will be addressed and presents the potential solutions that the researchers propose and will be developed in later sections of the report.

When we talked about how the summary had to be prepared, we stated that it had to be left until the last moment, once the rest of the sections were ready. In the case of the introduction, this does not necessarily apply, but it is common to write it, at least in part, after having written up the method and the outcomes. This may seem paradoxical, given that it is the section where, as will be seen below, the background is outlined to provide information as to where you started from, and it is also the space where the objectives must be made known, which are what allow you to determine where you want to go. You have to assume that one thing is the *sense of timing* in which the researcher and their collaborators solve the day-to-day of a research project, and the other, the *sense of timing* in which this research plan that has already been executed, is explained in a report. It is obvious that the researcher knows where they started from and where they have gone. You have to assume that you can afford not to write an introduction until you have other sections of the report completed. Keep in mind that until the analysis of results has been completed it will be difficult to have an accurate perspective on the scope of the research carried out, the fundamental conclusions that can be derived from the research and, therefore, what should be the best introduction that precedes it. On the other hand, inasmuch as this section has been shaped according to what has been written in the following sections, the introduction will facilitate the reader to arrive in a more fluid way at some sections, the outcomes and especially the discussion and conclusions, which are usually perceived as the most juicy material in a report. The entire document is usually written dynamically, since some sections are shaped as the others are being created.

The introduction needs to include everything important published so far, but without it trying to be encyclopaedic. You must keep in mind that the collection of the background should not be motivated by completeness, but by conciseness. You have to know how to report what is most relevant. In another case, a report would become a long and unattractive document for most readers. In addition, and it is very important, this requires starting from the assumption that your potential audience is not naive, i.e. is not made up of people who completely ignore the problem that motivates the research project. This assumption allows you to avoid writing an introduction as if it were the first time something has been written about the subject in hand.

Following the indications of the American Psychological Association (2010), an introduction should be able to answer the following questions:

- Why is the problem that motivates your study important?
- How does this study connect with those that have been done so far in this field of knowledge? How does this study disagree?
- What are the hypotheses or the primary and secondary objectives of the study?
- How do the previous hypotheses relate to the design that you propose in this study?
- What are the theoretical and practical implications of the study?

Rather than trying to give an explicit answer to each of the previous questions, what would be necessary is to resolve them throughout the text, since they provide a working guideline. Note that they are not titles that you have to mention explicitly in the text. You can see below the information blocks around which the introduction will have to be built.

1) The research problem

Explaining what the reason for the research is should be the first task addressed in the introduction. It should be explained briefly. Try not to exceed a paragraph. The function that it must have is to enable the reader to understand the magnitude or the extent of the problem. This can be achieved by explaining who is affected (example 4, Galan-Mañas, 2015) or by explaining what has an impact: in the educational and social field, in health or, why not, on its economic cost. In the case of works that are purely theoretical in nature, the relevance of the problem is often oriented towards the fundamental features or gaps that can be revealed about the internal or external validity of a theory (example 5, Chan *et al.*, 2008).

Example 4

“According to the data of the Committee on Equality and Non-Discrimination of the Council of Europe (2014), over eighty million people are affected by a disability in the European Union. In the case of Spain, around 2.5 million with a recognised disability [...]. The strategy carried out by the European Union on disability (2010-2020), highlights the need for access to quality education and lifelong learning. With the aim that people with disabilities obtain an improvement in their quality of life and full participation in society”.

Example 5

“Duncan and colleagues (Duncan, 1986, 1995; Duncan & Owen, 2000; Duncan *et al.*, 2000) emphasize the crucial role of a set of goals or subgoals in governing the optimal function of human behavior. In his goal-neglect theory, Duncan proposes that human behavior is goal-oriented or goal-directed and it is controlled by a list of goals or subgoals. These goals are formulated, stored and checked in mind by an individual in order to behave optimally and properly in response to environmental or internal demands. One of the main functions of the goals is to impose a structure on behavior by controlling the activation or inhibition of behavior that facilitate or prevent task completion. The involvement of the frontal lobe in goal-oriented or goal-directed behavior is illustrated by the fact that patients with damage to this area are usually disorganized and fail to achieve intended goals or what Duncan refers to as “goal-neglect”. Although these patients are apparently able to remember the intended goals, they tend to lose sight of these goals and their actions may become random or stuck on one or more subgoals”.

2) Background

The second part of the introduction, and which will become the broadest part of this section, will be the background. Here you must explain the key work that has been done concerning the study problem, including the most cited publications which have had the most impact in the specific scientific literature thus far and, preferably, the most recent. In other words, you have to know what the state of the play is. The most demanding task at this point is to know how to find this relevant material and discern the results that allow you to draft the current state of play. You will have to guide the reader from what is known to the present moment, going through the inconsistencies observed (shortcomings and limitations) to a resolution proposal that will be specified in the research proposal of your project.

Obviously this is not a simple task. Writing an introduction requires having adequate access to documentary sources, specifically, access to publications with full text. In addition, it requires a comprehensive reading of this material interconnecting the similarities and discrepancies of some points and others and you being able, subsequently, to write a summary of the material with a balanced result that is well focused and goes from the most general to the most specific points. It needs to be narratively understandable, to report upon updated material and to present your proposal convincingly.

What types of publications can you find when you are exploring the background of interest? Montgomery (2003) proposes a grouping into four major types of publication:

- 1) empirical studies
- 2) literature reviews
- 3) theoretical articles
- 4) others

In the case of empirical studies we will talk about publications that include original studies in which research is carried out according to a classic research structure, i.e. projects where the introduction is available, some objectives or

hypotheses are proposed, a methodological framework is established where one or more samples of participants are generally explored, the collected data is analysed and the outcomes are concluded by discussing them. This is the most common type of scientific publication.

The second type of article is basically characterised by having a single document that summarises several research projects, for example, studies such as those described in the previous paragraph which look at the same problem or scope of study. A search for studies is made, which can be more or less systematic, and a compilation of the outcomes is made. Within this group of publications, meta-analytic studies stand out. These are generally very systematic and structured studies that employ quantitative analysis procedures in which the data collected from each of the original studies is analysed and combined through various statistical indices. Thanks to this combination of results, statistical estimates with more power and precision are obtained. This convergence of data can even allow you to find interesting patterns of results that, by exploring the studies separately, would otherwise be difficult or simply impossible to observe. The subject of interest among the various meta-analysed studies must obviously be the same and the methodological conditions comparable. The latter is usually the main limitation of this type of approach. Meta-analyses have now become publications with great appeal to researchers. It is usually easy to identify a meta-analysis study, since this condition is usually made explicit in the title of the publication itself (example 6, Wang *et al.*, 2017).

Example 6

Title: *Prenatal, perinatal, and postnatal factors associated with autism: A meta-analysis*

Summary: “Data from 37,634 autistic children and 12,081,416 non-autistic children enrolled in 17 studies were collated. During the prenatal period, the factors associated with autism risk were maternal and paternal age ≥ 35 years, mother’s and father’s race: White and Asian, gestational hypertension, gestational diabetes, maternal and paternal education college graduate, threatened abortion, and antepartum hemorrhage. During the perinatal period, the factors associated with autism risk were caesarian delivery, gestational age ≤ 36 weeks, parity ≥ 4 , spontaneous labor, induced labor, no labor, breech presentation, pre-eclampsia, and fetal distress. During the postnatal period, the factors associated with autism risk were low birthweight, postpartum hemorrhage, male gender, and brain anomaly. Parity ≥ 4 and female were associated with a decreased risk of autism. In addition, exposure to cigarette smoking, urinary infection, mother’s and father’s race: Black and Hispanic, mother’s country of birth outside Europe and North America, umbilical cord around neck, premature membrane rupture, 5-minutes Apgar score < 7 , and respiratory infection were not associated with increased risk of autism”.

The third group of publications are basically theoretical studies. These are publications in which an exploration of the existing literature is carried out with the aim of generally delving into some theoretical aspect of relevance to the problem of interest. Often it is common to influence the internal or external validity of the theory within which the reason for the research is inserted (example 7, Gonzalez-Pienza, 1997).

Example 7

Title: *Self-concept, self-esteem and school learning*

Summary: “Self-concept is one of the most relevant variables within the sphere of personality, both from an affective and motivational perspective. The multiple investigations that address it coincide in highlighting its role in the regulation of cognitive-motivational strategies involved in learning and academic performance. However, this extensive research is demanding a summary that harmonises the accumulation of information available in relation to this construct. In the present work, we offer a point of view on how to integrate this information (sometimes coincident, sometimes remarkably contradictory) into a hypothetical model, briefly describing its basic characteristics or pillars”.

The last group of publications is a miscellany. Out of this set of publications, two stand out: case studies, publications that report unique cases often designed to exemplify the practical implementation of some type of intervention or provide an exhaustive phenomenological characterisation of the case; and methodological studies, publications where the focus is on presenting some new technique or methodological strategy.

3) Proposal

The third and last part of the introduction will be the space where a study proposal is made. Sometimes this paragraph begins by explaining the shortcomings or limitations observed so far in the literature. Next, you explain what your approach will be, with the aim of trying to solve the problems that you have been highlighting. The proposal that you make should be specified in some research questions, which, following the recommendations of Echeverría *et al.* (2012), they need to have the following characteristics:

- **Specific:** they are limited to the research area in which you operate.
- **Relevant:** they provide an insight into a specific area.
- **Explicit:** they enable a clear answer.
- **Viable:** they propose an appropriate method and have the necessary resources to deploy it.

These questions can be formulated in the text as objectives or hypotheses. The objectives basically express where the research is going, the purposes it pursues and, therefore, establish its purpose. A common way of formulating the objectives is by doing so using the infinitive with verbs like: “*to determine*”, “*to establish*”, “*to show*”, “*to prove*” and “*to evaluate*” are good options. If the text is written as a series of objectives on very specific or highly operational aspects, terms such as the following could be used: “*to calculate*”, “*to select*” or “*to identify*”. All these verbs express the intention of seeking more or less specific knowledge. You must avoid verbs like “*to find out*”, “*to study*”, “*to understand*” or “*to know*”, as they are actions that are not specific enough and too subjective. They end up allowing any kind of response or conclusion. A

maximum of three objectives is sufficient. Avoid merging two objectives into one: you have to allow each objective to be understood as a unique concept and that this can also be resolved in a specific way.

The hypotheses can be understood as a proposition aimed at providing a provisional explanation of the problem that must be solved. This solution will be tentative, i.e. by proposing a possible answer to the problem posed which must be confirmed or refuted depending on the outcomes obtained from the study. One or more hypotheses should be formulated in accordance with the considerations that have had to be constructed throughout the introduction, specifically, the proposal that the researcher has made explicit to try to solve the problems that give meaning to the search of interest.

It should be as short as possible and formulated in the affirmative. It must be verifiable, directly assessable and measurable. Regarding its structure, it has to be said that this can take various forms. One of the most classic is use of the conditional, such as “If A is given, B must be given”. But other formulation strategies can be used. Another possible structure that you propose could be “As A changes, changes in B will also be observed”. Others are formulated by the use of an analogy: “If this fact produces B, and C is comparable to A, an effect comparable to B, etc. should be produced”. Whatever the formulation chosen, it must always entail an operational and unambiguous approach. As in the case with the objectives, it is advisable that you present few hypotheses and in an orderly manner, according to their relevance.

Although it is not expected that there may be numeric parity between objectives and hypotheses (two hypotheses could be generated from the same objective, for example) each hypothesis should be perfectly identifiable in an objective. When formulating the objectives (example 8, Galan-Mañas, 2015) or hypotheses (example 9, Gonzalez-Pienda *et al.*, 2008) try not to break up the cohesive nature of the introduction.

Example 8

“[...] In order to respond to the needs of students with disabilities at the Autonomous University of Barcelona, the “Tutorial Action Plan for Students with Disabilities” project, funded by the Ministry of Education (2011), has been developed. The objective of the project has been to create a document in which the stakeholders, actions and times when the university must act to give attention to this group are defined. As a preliminary step to designing the Plan, it is opportune to identify what kind of actions are being carried out in Spanish universities so as to understand what the current situation is and also to inspire the basis of the Plan proposed. Accordingly, an analysis of the actions carried out by a group of 40 Spanish universities is presented in this article”.

Example 9

“[...] Once the proposed intervention is carried out, it is expected that the students of the GE, with respect to those of the GC will: (1) present a greater mastery of the comprehension processes, both literally and inferentially; (2) show a greater confidence in their competence to select, organise and elaborate ideas and/or important concepts; and (3) show a more positive attitude towards learning social sciences, to the extent that: a) they show a higher level of interest at work in this curricular area; b) a greater level of effort and involvement in academic activities/tasks; c) greater confidence in their ability

to successfully address the subject; and d) a higher level of academic performance in the subject of social sciences. Finally, it is also expected that GE students will positively value their participation in this educational experience”.

It is evident that the suitability of the questions that you formulate will depend on the relationship that these establish with the background. They should be questions that cover some of the substantial shortcomings evidenced throughout the introduction. However, the questions must also be perfectly linked to what will come next. This means that their suitability should be assessed according to how they connect with the sections that will be explained later, specifically, in the method section. The correct resolution of the questions must be able to be derived from the set of methodological and technical decisions that have been executed in your study. Monitor this aspect carefully and ask if, after doing what has been done, it is possible to give a satisfactory answer to the questions you ask: depending on the type of participants that have been selected, how you have assigned them to the different conditions of study, the type and quality of the measures used, the variables that have been finally evaluated, how you have recorded them, how you have analysed them, etc., is it possible to give a specific and unambiguous answer to the questions as you have written them?

4.1.3. Method

The method is that part of the report that will show how the study has been carried out. You will need to correctly define the samples of participants explored, the type of design implemented, the concept and the types of variables collected, how the study was carried out and how the variables will be analysed.

This section is key to allow other researchers to be able to repeat your outcomes, where necessary. It must be highly exhaustive. The elements that form part of it are so relevant to the report that the quality of your research will basically be evaluated on this section. The method has several subsections that will be specified in the report: design, participants, procedure and measures.

1) Study design

Knowing how to properly identify and describe the type of design of your study in the report goes beyond the intentions of this module. However, your report needs to include the name of the design that characterises your study. This definition will allow readers who are more accustomed to these technical descriptions to get a quick idea of what the fundamental features of the study structure will be and to make a generic estimate of the scope of the study's internal validity.

In many cases there is the possibility of applying different methods to solve the same problem. You should offer a set of reasons that justify your decision. The design used will not always be the one you would have wanted, or the one that will offer the best guarantees when it comes to using the outcomes more widely, or it may not be the design that ensured the most desirable control conditions, but it may be the design that offers better feasibility or efficiency options, according to the different conditions that you can find in ecological conditions (depending on available professional and economic resources, possibility of access to the population, etc.). You should have a basic knowledge of these aspects, but you should also have someone who can evaluate your report. The person who knows the different types of research design obviously knows its best virtues, but also its limitations and—what ends up being more relevant in applied conditions—the difficulties of it being implemented. Although you cannot consider a strategy to automatically justify any methodological decision, if you offer consistent arguments as to why you have used that design and not another, you will be offering elements on which it will be possible to provide an assessment from a more accurate perspective. Do not miss the opportunity to do so in the report. The design of the study greatly conditions the validity of the study, but this set of brief and focused arguments may enable the diffusion of arguments against your study, sometimes based on clichés or generalities about the use of one design or another.

Although knowing the type of a study's design is relevant, the location of the corresponding subsection in the body of the method does not cease to be an aspect that is not usually formalised. If you have the opportunity to read some scientific articles from different journals you will see that not only do many not have an explicit space assigned to the concept, but simply nothing is said about it. Some publications do not even formally anticipate this concept. The reader, in line with what is stated in the subsections for participants and procedures, must infer the type of design. We are of the opinion that the description of the design, if possible, should have an explicit space. Where should it be located? See examples 10 (Gonzalez-Pienda, 2008) and 11 (Calvo *et al.*, 2016).

Example 10

“Method

Design

Taking into account the proposed objectives, it is proposed to contrast the effectiveness of the strategic instructional model from a quasi-experimental perspective through a pre-test/post-test design of a non-equivalent control group. The control and experimental groups are not equivalent since the dynamics of the didactic departments themselves do not make assimilation possible by randomisation.

Participants

In the present study 107 students from the 3rd year of Compulsory Secondary Education participated [...].

Example 11

“Method

Participants

This is an observational, cross-sectional study of a total number of 129 outpatients who were consecutively referred from the Psychiatry Department of General University Hospital in Barcelona (Spain). These patients were distributed in two samples. The BPD sample consisted of 84 outpatients (BPD sample), of whom 92.9% were women ($n = 78$), and their mean age was 30.10 years ($SD = 9.61$), 58.3% ($n = 49$) had an educational level equivalent to primary studies or less, and 69.1% ($n = 58$) were unemployed or on disability leave. The non-BPD sample consisted [...].”

Example 10 places the section on the design before the ‘Participants’ subsection. Example 11, on the other hand, mentions the type of design, but does not give it a segregated space, but rather locates the description in the ‘Participants’ subsection. When there is no differentiated space due to the type of the design, this is usually arranged by heading the ‘Participants’ section. The strategy followed in Example 10 is recommended, i.e. give it its own space in the section on design and place it at the top, assuming that the type of design already acts as a very condensed presentation of the basic structure of the study that will be presented throughout the method.

2) Participants

In this subsection you need to provide an adequate visualization of the people that form part of the study sample. The subsection will report information about the socio-demographic profile of the participants (age, sex, ethnic group, level of academic training or employment status are some of the most typical variables). Keep in mind, however, that this information, specifically the location in the text of the report, may have different interpretations.

In many publications the description of the sample is available in the first part of the results. Before the analysis of the objectives or hypotheses is properly resolved, the profile of the sample is described. In other cases, it is considered that the description of the participants is an apriorism that must be resolved in the space where they are described, i.e. in the subsection here. The issue that justifies one strategy or another is whether the profile of the participants (their mean age, the percentage of men and women, employment status, etc.) should be considered part of the research results or not. As we said, there are many publications that place the profile of the participants in the results section. And when they do, they often refer the reader to a table, usually the first, where this information is numerically summarised. Whether there be 62% of girls, that the mean age is twelve years or that the majority are from public schools are aspects that are undoubtedly a product of the type of sampling you have used and that, therefore, it could be said that they are the result of your course of action. However, unless the research question precisely took

Participants or subjects?

Although subjects have been talked about for many years, we recommend using the term “*participants*” when referring to this subsection. This is the term that has been imposed (and recommended) in recent times.

the form of an epidemiological objective interested in the socio-demographic characterisation of a given population, it could also be considered that this data does not have to be part of the results, but rather it is a trait directly linked to the characterisation of the participants. The APA (2010), for example, advocates the latter approach: the profile of the participants is considered to be an apriorism, not forming part of the results but of the method and, therefore, it must be located in the 'Participants' subsection (example 11). Example 12 (Martínez *et al.*, 2016), however, corresponds to the alternative option.

Example 12

"Results

Table 1 presents the descriptive values of the socio-demographic and clinical variables of the sample. The most frequent profile was a middle-aged woman, with primary or high school education, married or living with a partner and of Spanish origin".

There is no better or worse way of doing it. However, the description of this subsection has started by taking part of a decision, that of reporting the basic information about the participants, in the space of the same name. Once the basic profile of your sample is described, the next step is to describe how it was obtained. In other words, what it was about the sample that has allowed some people, and not others, to have been selected to form part of the study sample.

The reader of your report should be able to know in some detail what has been the traceability of the people you have finally analysed. This aspect should receive more attention than it has received in the past in too many cases. In order to properly understand how a particular sample has been reached (what sampling has been carried out), what considerations have conditioned its incorporation (inclusion criteria), which have done just the opposite (exclusion criteria)... all are key elements in determining what the capacity of your sample is for applying the results obtained with greater or lesser determination. Look at example 13.

Example 13

"The sample consists of 129 women and 72 male students from the Autonomous University of Barcelona. All the participants were volunteers and answered a message posted in a virtual campus of the university, asking for collaboration to participate in a study on educational attitudes".

It is a fictitious description, but there are many real cases similar to this one. There are many questions that we must ask ourselves: to whom is the campaign aimed? To all the university students? Does everyone have access to this virtual campus? How did the interested parties get in touch with the researchers? Has the participation of any of these people been rejected? For what reason? They generate too many questions. It is difficult to consider who the population may be where some inference can be made in a marginally consistent way. This is a type of description that should be avoided.

Most of the samples that you will encounter, not only those that you can collate in your reports, but the vast majority of those that you will find published, end up being samples of convenience i.e. samples that are part of your study because they were the more accessible to researchers. This has been mentioned before. Although this type of sampling usually presents relevant limitations when it comes to facilitating increased use of the results obtained, it must also be accompanied by a careful description.

A very relevant concept linked to any sampling carried out is the percentage of people who have wanted to participate in the study once they have been proposed. If you can, try to design your study so that you can retrieve this information later on. This data provides relevant information on whether participation has been greatly rejected or rejected a little, which results in knowledge, again, about the scope of its generalisation. It is also interesting to know if the participants were paid anything to be a part of the study. In some studies, no economic compensation is provided, but there is some other incentive to participate. It must be specified: you can buy public transport tickets, give a gift voucher, etc. If there has not been any specific incentive strategy, it will also be announced. One sentence is enough (see example 14 proposed by Vidal *et al.*, 2014; bold is added).

Example 14

“As for the community control group, 102 subjects were screened and 98 fulfilled the inclusion criteria. The study was approved by the ethics committee of the hospital and all participants signed an informed consent. **Patients receive no funding for their participation in the study**”.

Please note that, as already explained, the main idea of this subsection is that the reader can build up a fairly accurate picture of where our participants have come from and who has ended up being analysed. One recommendable option, which is increasingly become more present in scientific literature, is to report explicit and direct information on the number of people and the reasons that have determined the non-inclusion of participants in the sample. If this information is reported graphically, you will achieve an excellent result. A flowchart is an excellent solution. It is an easy-to-design tool that enables you to easily communicate how a final sample has been reached, presenting the conditions that have been occurring and the number of people who have been involved in each one of them. Figure 8 is a flow chart extracted from a study designed to learn about the health status of a group of workers at Barcelona City Council who participated in a smoking cessation program five years earlier (Nieva *et al.*, 2017). In the original study, the participation of all the workers at Barcelona City Council (N = 9096, in 2012) was requested, as can be seen in the first box. From this point on, each event is described and the sample that results from them.

Figure 8. Example of a flow chart



Source: adapted from Nieva *et al.* (2017)

To finish this subsection: do you have information detailing the people who have not participated in your study at the end (why could they not have been included in the sampling, why have they abandoned it before concluding it, etc.)? For example, do you know their age, gender or some other variable that may have some relevance from the sample's descriptive point of view? Take advantage of it. Do not miss the opportunity to compare people who have participated in the study with those who have not. You can do this by using basic inferential statistics; for example, a comparison of means, a contrast of percentages, etc. as you would for any other variable of the results. This gives more quality to your search. If the data agrees between both groups of people, the result is excellent. It can be inferred that, at least with respect to these general variables, the people included in the sample are no different from those who have not been included. In the event that there is a discrepancy, you can report it as a study limitation.

3) Instrumentation

Also known as the materials subsection, it allows the dependent variables of the study to take centre stage. First of all, go back to review the hypotheses that appeared in example 9. Next, carefully explore the subsection on tools that appears in the same publication, that of example 15 (Gonzalez-Pienda, 2008).

Example 15

“Materials:

Information gathering tools:

Test of Reading Processes (PROLEC-SE). Prepared by Ramos and Cuetos (1999), the PROLEC-SE is an evaluation test of the reading processes of students from approximately 10 to 16 years old. In particular, it evaluates the lexical, syntactic, semantic and reading comprehension processes. The latter and semantic processes are the ones used in this research to assess comprehension through the presentation to students of two expository texts. After having carefully read a text, the tasks presented involve the individual answering several questions about the content of said text, half of them literal (information is requested as to what is explicit in the text read) and the other half inferential (in order to answer the questions, it is necessary to carry out inferential processes, for which efficient processes of selection, organisation and elaboration of the information are necessary) [...]. *Teacher Observation Questionnaire (TOQ)*. A brief questionnaire, where each participating teacher assesses the initial (pre-test) and final (post-test) status of their students with respect to: a) the ability to select, organise and elaborate the information; b) student effort; c) attitude towards the subject; and d) academic performance. *Hypertext Learning Assessment Questionnaire (HLAQ)*. The HLAQ is a questionnaire comprising 10 items, designed for this purpose, so that each student in the experimental group values different aspects related to the development of the teaching-learning process through the use of hypertext”.

As can be seen, there is an adequate correspondence between the variables mentioned in the hypotheses and the variables that are later included in the instrumentation section. The exception would be found, however, in the case of hypotheses *c* and *d*, which are not mentioned in the subsection. It would also be necessary to describe them in this section. In any case, this is a key consideration of the subsection: explain what measures or evaluation strategies will be implemented to operationalise the outcome variables that make up your study: observation, interviews, questionnaires, scales, records of any kind, etc. Everything must be collated. And if you ensure an adequate correspondence between the variables mentioned in the objectives or in the hypotheses and these measures, all the better.

Keep in mind that the tools proposed in the previous example are accompanied by the most relevant references. These citations allow you to find the measure when you need it or explore some of their properties. In the case of measures adapted to the language of participants, it would be necessary to be able to reference the publication that was responsible for this adaptation, since many of the measures you use have not been originally designed in the language in which you will probably do the evaluation. In addition, and to the extent possible, some very brief explanations should be included, accompanied also by appropriate references regarding the advantages of the measures' psychometric properties. The fundamental idea, again, is to be able to report on the methodological quality, in particular regarding the tools used. In this respect, if you have information about the tool's adaptation process, it would be advisable to specify it. In example 16 (Viñas *et al.*, 2012) information is reported, not only on some aspects of the psychometric properties of the measures used, in this case on its internal consistency (internal reliability), but also on some strategies applied to adapt the version to the sample of participants.

Example 16

Adaptation of a measure

It is a process in which a measure, created for a language (and, therefore, often for a culture), is adapted to be understood and correctly answered in another language (which at the same time is associated with another culture). It cannot be understood only as a translation process.

Internal reliability

This refers to the quantification of the degree to which items that are part of the same evaluated concept tend to relate to each other. It involves cross-checking between elements that supposedly measure the same. Its range is 0-1 and values close to 1 are desirable (= more correlation = more concordance = more cohesion).

“Early adolescent temperament questionnaire (EATQ-R) (Ellis and Rothbart, 2001). Self-reporting type questionnaire consisting of 86 items, assessed on a 5-point Likert scale, which allows the evaluation of 11 temperamental dimensions. According to Putnam, Ellis and Rothbart (2001), second-order factor analysis provides three major dimensions: negative affect (formed by the frustration dimension), voluntary control (which includes the dimensions of activation control, inhibitory control and attention) and upwelling (constituted by the pleasure dimensions of high intensity, fear and shyness, these last two with a negative influence). The scores for the EATQ-R dimensions represent the average score of all the items of each dimension. For its translation and adaptation to Catalan, the translate-retranslate method was used. In addition, each item was compared and valued by independent experts, and according to Sperber (2004), according to the degree of semantic and conceptual equivalence. The Catalan version, in comparison with the original version, presents minor differences in the structure of the temperament (Ellis, González and Viñas, 2009). For each of the evaluated dimensions, the internal consistency found was the following: negative affect (65), voluntary control (76) and upwelling (76), once some items were eliminated (2, 8, 10, 27, 29, 32, 55, 71, 89 and 92) that had a low contribution to reliability”.

4) Procedure

How do you carry it out? This is the key question of this subsection. You have to write up the details of the actions carried out. If it is a study in which the main objective is an intervention, try to detail how the various groups were generated with respect to which intervention is being articulated. Keep in mind that the way in which the participants are assigned to the conditions of this intervention, i.e. how it is determined that participant X is part of group A and that participant Y is part of group B, must be connected to the type of design that has been described previously. Thus, for example, you may be talking about an experimental study if the subjects were randomly assigned to two or more different study conditions, or of the quasi-experimental design when, frequently, a single group of people is evaluated before and after an intervention (see example 17, Gonzalez-Pienda, 2008).

It is certainly relevant to describe how the study conditions are shaped, but also how the variables of interest are obtained. Although the study does not involve an intervention, but rests basically on the exploration of several variables in one or more groups of participants and the relationship established between these variables or groups of participants, the description of how these variables are obtained will also be essential (see example 18, Vega *et al.*, 2016).

The study can either carry out an evaluation of the participants with an interview or a questionnaire, or by using data obtained from historical records. How you carry it out is irrelevant. You must describe the strategy followed and the chronological order in which it occurred.

Example 17

“The intervention model combines the learning of the hypertext strategy and its application, both to teach the conceptual contents and to work the procedural aspects. To handle the tool, each teacher followed an online course of ten sessions. After the course (two months, approximately), the teachers applied the strategy to social sciences classes delivered to those in the 3rd year of Secondary Education. After this phase, teachers taught the strategy to their respective groups of students following the steps of the SIM model (Strategy Intervention Model, Deshler, Ellis and Lenz, 1996), over eight sessions, distributed at the rate of one hour, two days a week, for four weeks in total. Initially, students try to reflect on their way of learning. Next, the teacher describes the strategy and applies it, by modelling the process and introducing the appropriate verbalizations to fa-

Facilitate its representation and long-term recall. Once the description and previous modelling have been completed, the practical phase is proposed, first while mediated (teacher and classmates) and then autonomously. This phase, key for managing the strategy, was structured in seven steps: 1) present the content; 2) identify the title and write it inside a rectangle; 3) select the key concepts and write them inside ellipses; 4) relate the selected concepts with link sentences; 5) specify with examples some of the final concepts of hierarchies and write them below dotted lines; 6) create the layout in writing using the new hypertext structure, placing the punctuation marks in their place; 7) review the resulting linear text, as well as the entire process developed with the CD "Hyper" (Álvarez, Soler, Tamargo and González-Castro, 2001), through the computerized version".

Example 18

"The research is based on the population of Canarian companies with workers in the province of Santa Cruz de Tenerife in 2012, made up of 29,298 companies, according to the Central Companies Directory (CCD) prepared by the National Institute of Statistics (INE). To calculate the sample size, a confidence level of 95% and an error rate of 5% were considered. A simple random sampling was applied and 1,608 companies were contacted. Information held by the Chamber of Commerce of Santa Cruz de Tenerife on the companies that are part of it was used. Given the low level of response (around 40% of the completed surveys), companies registered in the Cabildo de Tenerife database were contacted, while respecting representation by sector and company size. 292 companies responded. This means that, for a confidence level of 95%, the estimation error committed in the final sample is 5.71%. [...] The results obtained helped to improve the writing and include new items. To delve deeper into the results and explore the opinions of the business community, a discussion group was organised with businessmen from the province and representatives from the Association of Women Entrepreneurs. Use of this technique is justified by its usefulness in learning and understanding attitudes, feelings, motivations, perceptions and opinions from the perspective of those involved. To form the discussion group, it was taken into account that the following were represented: companies of different sizes (based on the number of their employees) and business agents of both sexes".

Increasingly, participants in a study are asked to give their consent to participate. Do not stop doing this wherever possible. Just think that if you are considering the possibility of sending your report to a scientific journal, this can even become a requirement. This authorisation generally consists of two different parts, but preferably in the same document, which is delivered to the participant (or parents or legal guardian, in the case of minors) after having given the necessary explanations. The first part of the document informs the participant about the objectives of the study and how the data gathered will be processed (the aspects relating to data confidentiality are fundamental, as already mentioned). In the second part, the participant's signature must appear, which assures that he/she has received all the pertinent information, that he/she has been able to ask any questions considered necessary and, finally, that he/she agrees to participate in the study. One sentence is enough to place it on record (example 14).

5) Analytical strategy

We come to the last of the method's parts with this subsection. It is necessary to describe the strategy used to analyse the data that has been obtained from the measures provided in the subsection on tools and in accordance with the procedure described in the previous subsection. The possible options for approaching the analytical strategy are very diverse as is the way of explaining

them too. As has been indicated so far, try to provide enough details about what has been carried out, but do not forget to take into account the criterion of relevance.

If you have to use statistical procedures, and what will be expected if the approach is quantitative, avoid prescriptive descriptions: “In order to analyse quantitative variables, a correlation was used, whereas for qualitative variables, Chi square was used”. It may be useful to focus on the objectives or hypotheses on which your search is based. Look at the specific variables that form part of it, starting with the main one, and describe the statistical approach using these objectives and the variables that form part of them as an outline.

You have to assume that the reader has statistical knowledge; therefore, you must not go into the basics of the technique used if you are talking about classical strategies (correlations, comparisons of means, analysis of variance and covariance, simple, multiple or logistic regressions). Only when the analytical strategy is new, little known or little disseminated in the educational field should it be explained properly. In this case, do not forget to provide some reference that covers you. This will make it easier for the reader to document if they have doubts (example 19, Blanco *et al.*, 2016).

Example 19

“A descriptive analysis, item analysis, reliability of the scales, exploratory factor analysis and correlational analysis were carried out. The reliability of the measurements was evaluated using the Cronbach alpha coefficient. Although there are alternatives specifically adjusted to the ordinal nature of the items (Gadermann, Guhn and Zumbo, 2012) the available evidence seems to sufficiently justify the classic estimate when the number of response options on Likert-type scales is equal to 6 or higher (Elosúa and Zumbo, 2008), as is our case (with 7 options). On the other hand, the current recommendations on the use of Exploratory Factor Analysis in the validation studies (Izquierdo, Olea and Abad, 2014) are also adopted, particularly avoiding the use of the pack called “Little Jiffy”: Principal Components Analysis plus Kaiser plus Varimax (Lloret Segura, Ferreres-Traver, Hernández-Baeza and Tomás-Marco, 2014). All the factor analyses were carried out with the FACTOR programme version 10.3.01 (Lorenzo-Seva and Ferrando, 2015) by following the following guidelines: Tentative theoretical forecast of the configuration of factors that are expected to be found. Factorization of the polychoric correlation matrix, according to the nature and distribution of the data. Assessment of the suitability of the data for its factorization by means of the sampling adequacy test by Kaiser-Meyer-Olkin (KMO) [...]”.

Provide, if necessary, some specific information about the distributions of the variables of interest. For example, if it is a question of variables with some peculiarity in their distribution and if it has been necessary to apply some strategy to manage this exceptionality (for example, transformation when a very skewed distribution) this will have to be explained (example 20, Valero *et al.*, 2017).

Example 20

“Driving awareness courses, loss of driving license, having been arrested and in prison, or having had legal problems—counting variables—had a strong positive skewed distri-

bution. To simplify the approach, they were transformed into binary variables (zero vs. one or more episodes)".

Your data will probably have missing values in some variable; this is the most common. If you consider that you can manage this limitation in some way, explain it. It is a good quality indicator that is increasingly being reported (example 21, Valero *et al.*, 2017).

Example 21

"The mean percentage of missing data in any risk correlate was less than 1.5%. Although the ratio of missing data is low, the application of a listwise deletion strategy, for example in the context of a multivariate approach, would lead to the loss of around 8% of the subjects of the original sample. In order to prevent this bias associated with the exclusion of subjects with some missing observations, an imputation process was calculated based on expectation maximization (EM) and using the rest of risk correlates with no missing data as predictors".

If the variable pending study must be manipulated or transformed in some way, take advantage of this section to do it. Explain why and how you performed this manipulation (example 22, Valero *et al.*, 2017a). Finally, if you are using some software to run the analyses, do not forget to include it in the study and specify the version (example 23, Torrecilla *et al.*, 2015).

Example 22

"Diagnoses provided by the MINI interview were grouped, when conceptually and clinically possible, in higher order diagnostic factors. The depressive factor included depressive disorders, dysthymia and affective disorders [...]. Cluster analysis and regression models were executed using SPSS v20".

Example 23

"In the processing of qualitative data, we relied on the NVIVO v.6 programme (licensed for the research group), by means of which the categories are delimited, and the weight of the information is checked. Furthermore, the relationships between the qualitative categories with the GEPHI programme (free license) were studied, allowing us to show the existing relationships between the satisfaction dimension with the rest of the nodes".

4.1.4. Results

This section describes the results of the analyses. As we have already done, this section is usually started in many publications by describing the profile of the participants in the event that a decision has been made to not describe it in the method section. The strategy is usually simple: the reader is referred to a table describing these basic variables (age, gender, educational level, marital status, etc.). Review figure 4, which can serve as an example. Tables should be self-explanatory and should not be redundant: everything you write down in a table should avoid being reported in the form of text, unless it is necessary to specify a figure of great relevance.

You should stay in a purely descriptive sphere, avoiding any judgement or assessment. Valuations will be presented in the discussion. Try to restrict the use of evaluative adjectives (big, small, little, a lot, etc.). The correlations, the

means or the proportions are, at the moment, neither big nor small. Use these terms only in a comparison context: “result A is greater than B, C uses fewer attempts than D”.

Go back to re-read your objectives or hypothesis. It is recommended that you articulate the explanation and the content of the results according to these. That outline is useful so as to avoid getting lost. Go from the most important to the least relevant or secondary. Therefore, respond first to the main hypothesis and, subsequently, to the successive ones. Also look at what has been explained in the analysis subsection so it is duly explained in the current section. Observe that, often, you end up executing analyses that were not anticipated initially. Try to mention them in the sub-section on analysis.

When a descriptive measure is reported, such as a mean for example, it must always be accompanied by the corresponding measure of dispersion, such as the standard deviation. If you have used inferential statistics, do not forget to report the statistical techniques on which each specific analysis is based as a minimum (the T, F, etc.) and the statistical significance values that are derived from them (the p). In addition, you can report an effect size index (example 24, Valero *et al.*, 2017a).

Example 24

“An alcohol dependence diagnosis is statistically associated to be arrested (Wald = 21.89, $p < .01$, OR=4.4), the loss of a driving license (Wald = 22.32, $p < .01$, OR = 3.7) and to have a prison history (Wald = 4.45, $p < .01$, OR = 8.4)”.

Regarding the degrees of freedom, although it is advisable to report them (APA, 2010), it must be noted that it is rarely done. See the values in parentheses of example 25 (Alegret *et al.*, 2015). In fact, many journals do not require it. It may be especially necessary in those circumstances where many statistical analyses are carried out and the sample size may clearly change from one analysis to the other, for example as a consequence of not having the same number of participants in each analysis (missing values in some variables, etc.).

Example 25

[...] age (divided in two groups taking the cut-off of 65: $F(1, 107) = 28.51, p < .001$; age in years: $r = -.41, p < .001$ and gender $F(1, 107) = 14.89, p < .001$; had a statistically significant effect on the S-FNAME total summary score [...].

When reporting qualitative research results, keep in mind that all readers should not necessarily be familiar with the methods used. Remember that this is a less standardised field of knowledge than the quantitative one. You should provide an explanation of each of the procedures and the type of inferences that can be drawn from them (Ritchi, 2003). Look at example 26 (Torrecilla *et*

Effect size

It is a value that allows you to quantify how intense the association between two variables is. We can talk about Cohen's D, a correlation, an odds ratio (OR), etc.

Degrees of freedom

It is a property of each statistical test that depends on the number of parameters to be estimated and the size of the sample.

al., 2015). Try to show in the results if you are faced with a basically descriptive, explanatory or interpretative result, although often, and due to the very nature of qualitative research, there is a constant transposition between one aspect and others. Try to be as transparent as possible. Help the reader to understand where he/she is at any time.

Example 26

“The qualitative results obtained start from an ad hoc categorization process; i.e. the categories are configured from the collated information. For this, all the information about the participants is taken into account. This process was clarified via a consensus of criteria by several members of the research group, who were involved in this process. The resulting categories are included in Annex 1. One of the main nodes corresponds to satisfaction. Being consistent with our objective, we want to check how this node relates to the rest of the main nodes (improvement of the course, application and resolution at the centre). As can be seen in Figure 1, satisfaction mainly related to the application node and, secondly, to the resolution at the centres, there being no link between this node and the node improving the course. Furthermore, with regard to the descriptors of the node under analysis, the participants highlighted the similarity of cases in the discussion group (in relation to those experienced a posteriori in the centres), the dynamics and planning used in the course, along with overall satisfaction towards it, as the main causes that explain their liking with the received training, on an equal level (figure 2). In short, the determining factors, according to the qualitative analysis, are intrinsic to the course, being able to vary teachers and environments in their development”.

You also have to make the connection between the analytical part and the results clear; they should be in two different parts. In addition, try to lead the reader from the complexity of the original data to the narration of the stories that you have been drafting. You have to maintain consistency at all times. If the stories you want to convey are diverse, make the interrelation that links them clear.

Regarding the format of tables and figures, you must appreciate that all the visual material that you have been presenting will serve as a model. Figure 7 is a good example of a graph. Tables, according to their specific content, may have one structure or another: report descriptive information (figures 9 and 10), a comparison between groups (figures 11 and 12) or correlations (figure 13), for example. It is usually sufficient to draft a report with a maximum of four tables and one or two figures. If you need to report more visual material, consider using an annex in the report. This will be explained later.

Figure 9

Table 1. Descriptive statistics of the sociodemographic and clinical variables.

| Variable | |
|-------------------------------------------|---------------|
| Gender | |
| Men | 109 (34.7%) |
| Women | 205 (65.3%) |
| Age | |
| M (SD) | 45.42 (14.39) |
| Range | 18–81 |
| Age distribution | |
| 18–36 | 87 (27.7%) |
| 37–46 | 74 (23.6%) |
| 47–53 | 71 (22.6%) |
| 54–81 | 77 (24.5%) |
| Level of education | |
| Primary school | 142 (45.2%) |
| High school | 139 (44.3%) |
| University | 33 (10.5%) |
| Marital status | |
| Married/cohabiting | 198 (63.1%) |
| Not married | 50 (15.9%) |
| Separated or divorced | 59 (18.8%) |
| Widowed | 7 (2.2%) |
| Geographical origin | |
| Spain | 294 (93.6%) |
| South America | 12 (3.8%) |
| Morocco | 4 (1.3%) |
| Eastern Europe | 4 (1.3%) |
| Principal diagnostic category (DSM-IV-TR) | |
| Mood disorder | 119 (37.9%) |
| Adjustment disorder | 110 (35%) |
| Anxiety disorder | 33 (10.5%) |
| Personality disorder | 23 (7.3%) |
| Eating disorder | 7 (2.2%) |
| Substance-related disorder | 6 (1.9%) |
| Disorder of infancy | 6 (1.9%) |
| Environmental problems | 6 (1.9%) |
| Not recorded | 4 (1.3%) |

Note. $N = 314$. Disorder of infancy = disorders usually first diagnosed in infancy, childhood, or adolescence.

Source: extracted from Martínez *et al.* (2016)

Figure 10

Table 2. Means, standard deviations, obtained ranges, skewness, kurtosis, and alpha coefficients of the Zuckerman–Kuhlman Personality Questionnaire scales.

| Scale | Total sample ^a | | | | | Cronbach's alpha | | |
|----------|---------------------------|------|-----------------|----------|----------|------------------|------------------|--------------------|
| | M | SD | Obtained ranges | Skewness | Kurtosis | Total sample | Men ^b | Women ^c |
| N-Anx | 12.64 | 4.73 | 0–19 | –0.49 | –0.81 | .87 | .87 | .85 |
| Act | 7.57 | 3.49 | 0–16 | 0.06 | –0.78 | .71 | .70 | .72 |
| Sy | 5.83 | 3.44 | 0–16 | 0.46 | –0.26 | .76 | .78 | .78 |
| ImpSS | 7.02 | 4.12 | 0–19 | 0.52 | –0.43 | .82 | .84 | .80 |
| Agg-Host | 7.71 | 3.34 | 0–16 | –0.03 | –0.45 | .72 | .69 | .74 |
| Infreq | 1.85 | 1.76 | 0–8 | 0.96 | 0.42 | — | — | — |

Note. N-Anx = Neuroticism-Anxiety; Act = Activity; Sy = Sociability; ImpSS = Impulsive Sensation Seeking; Agg-Host = Aggression-Hostility; Infreq = Infrequency.

^a $N = 314$. ^b $n = 109$. ^c $n = 205$.

Source: extracted from Martínez *et al.* (2016)

Figure 11

Table 2
Means, Standard Deviations, *t* Test, and Cohen's *d* for the Domains of the NEO Personality Inventory–Revised by Treatments Outcomes

| NEO PI–R domains | Abstinent (<i>n</i> = 21) | | Relapsed (<i>n</i> = 52) | | <i>t</i> | <i>p</i> | Cohen's <i>d</i> | Completers (<i>n</i> = 34) | | Dropouts (<i>n</i> = 39) | | <i>t</i> | <i>p</i> | Cohen's <i>d</i> |
|------------------|-------------------------------|-----------|------------------------------|-----------|----------|----------|---------------------|--------------------------------|-----------|------------------------------|-----------|----------|----------|---------------------|
| | <i>M</i> | <i>SD</i> | <i>M</i> | <i>SD</i> | | | | <i>M</i> | <i>SD</i> | <i>M</i> | <i>SD</i> | | | |
| N | 60.09 | 8.98 | 64.90 | 7.55 | 2.33 | .023 | 0.58 | 61.38 | 8.83 | 65.38 | 7.25 | 2.12 | .037 | 0.49 |
| E | 43.81 | 11.69 | 42.71 | 11.45 | 0.37 | .713 | 0.09 | 43.70 | 11.38 | 42.43 | 11.62 | 0.47 | .640 | 0.11 |
| O | 42.57 | 10.93 | 41.46 | 8.22 | 0.47 | .637 | 0.10 | 42.18 | 9.47 | 41.43 | 8.71 | 0.35 | .729 | 0.09 |
| A | 44.19 | 10.78 | 39.38 | 9.10 | 1.94 | .057 | 0.48 | 43.65 | 10.49 | 38.26 | 8.47 | 2.43 | .018 | 0.56 |
| C | 40.00 | 9.89 | 32.69 | 6.58 | 3.12 | .004 | 0.89 | 37.53 | 9.17 | 32.41 | 6.72 | 2.74 | .008 | 0.64 |

Note. N = Neuroticism; E = Extraversion; O = Openness to Experience; A = Agreeableness; C = Conscientiousness.

Source: extracted from Ramos-Grille *et al.* (2013)

Figure 12

Table 4. Analyses of variance for Zuckerman–Kuhlman Personality Questionnaire scales analyzing the effect of gender, age,^a and their interaction.

| Scale | | <i>F</i> | <i>p</i> | η_p^2 |
|----------|--------------|----------|----------|------------|
| N-Anx | Gender | 30.06 | <.001 | .089 |
| | Age | 3.49 | .016 | .033 |
| | Gender × Age | 0.44 | .721 | .004 |
| Act | Gender | 0.21 | .640 | .001 |
| | Age | 1.13 | .334 | .011 |
| | Gender × Age | 0.17 | .915 | .002 |
| Sy | Gender | 2.99 | .084 | .010 |
| | Age | 4.16 | .007 | .039 |
| | Gender × Age | 2.71 | .045 | .026 |
| ImpSS | Gender | 0.22 | .637 | .001 |
| | Age | 14.10 | <.001 | .122 |
| | Gender × Age | 1.80 | .146 | .017 |
| Agg-Host | Gender | 1.49 | .222 | .005 |
| | Age | 3.63 | .013 | .034 |
| | Gender × Age | 2.88 | .036 | .028 |
| Infreq | Gender | 3.17 | .076 | .010 |
| | Age | 2.64 | .049 | .025 |
| | Gender × Age | 0.96 | .412 | .009 |

Note. *N* = 314. N-Anx = Neuroticism-Anxiety; Act = Activity; Sy = Sociability; ImpSS = Impulsive Sensation Seeking; Agg-Host = Aggression-Hostility; Infreq = Infrequency.

^aThe variable age is computed in quartiles.

Source: extracted from Martínez *et al.* (2016)

Figure 13

Table 3. Correlations among Zuckerman–Kuhlman Personality Questionnaire scales for total sample (*N* = 314, upper right), women and men (in parentheses).

| Scale | N-Anx | Act | Sy | ImpSS | Agg-Host | Infreq |
|----------|-------------|-----------|------------|-----------|-------------|--------|
| N-Anx | | -.10 | -.14 | .24 | .26 | .01 |
| Act | -.09 (-.12) | | .20 | .27 | .10 | .24 |
| Sy | -.20 (-.13) | .13 (.32) | | .16 | -.02 | .02 |
| ImpSS | .24 (.26) | .27 (.27) | .12 (.22) | | .22 | .17 |
| Agg-Host | .29 (.30) | .05 (.18) | -.04 (.03) | .25 (.16) | | -.19 |
| Infreq | -.06 (.07) | .24 (.24) | .04 (-.05) | .14 (.22) | -.24 (-.06) | |

Note. N-Anx = Neuroticism-Anxiety; Act = Activity; Sy = Sociability; ImpSS = Impulsive Sensation Seeking; Agg-Host = Aggression-Hostility; Infreq = Infrequency. In the total sample, values $\geq .14$ were statistically significant with an alpha of 5%.

Source: extracted from Martínez *et al.* (2016)

4.1.5. Discussion

This section requires you to be critical and judge the findings reported in the results. You have to properly connect these results with what has been published so far and show what has contributed to it and where you should go.

Below a structure is proposed to build discussion in the report. Although it is not necessary that you explain it in the text (it will not have a heading), it is recommended that you follow it. It will act as an outline that will help you to avoid leaving out anything relevant.

1) Remind the reader of the relevance of the study. Summarise what objective or what main hypotheses you intended to solve with the study. They will be the first sentences of the discussion. Do not repeat, however, the same as you wrote in the final part of the introduction. Express the same, but in other words. Also explain what your study entails in terms of novelty regarding what has been seen so far in the literature, but not in reference to the results, which will be done later, but in relation to the study approach: in what direction are your original and unpublished objectives headed? Does the method involve an increase in internal validity with respect to what has been published so far? Has the type of sample been examined to date? See how this data is presented in example 27 (Valero *et al.*, 2017).

Example 27

“This is the first study to assess the prevalence of psychiatric disorders among people who have lost their driving license because of their risky behaviour behind the steering wheel. This study allowed us to examine the relevance of a single psychopathological disease to predict risky driving behaviour and hence, car accidents. Interestingly, in the current study, the participants were not selected based on specific psychopathological diseases but rather, we included a group of people who had already lost their driving license due to previous traffic violations”.

2) Provide a critical analysis of your main results. What has been the most relevant discovery of your study? You can talk about the results now. Describe them carefully and complement them with the results that, despite being major, are not so relevant. Be careful not to repeat the same thing that has already been described in the section on results. Now you have to interpret them, judge them, argue them... but do not quote them again.

Remember to relate your judgements, again and as in the case of the introduction, to the existing literature. However, do not reproduce the same forms of the introduction again. Observe that now you have the results within reach, while in the introduction (it is assumed) you did not have them. Articulate the narration of this part of the discussion around the results. Review the key elements of the introduction using what you have obtained from the study as a guiding thread. How is everything you mentioned in the introduc-

tion now significant? Has it modified substantially? Do the ideas converge? Throughout? Only partially? Evidence and argue the agreements and the disagreements.

In the case of quantitative research, do not explain the results of the discussion constrained exclusively by their statistical significance. Firstly, this is because statistical significance has only been one tool, a relevant technical strategy for the resolution of results. And it remains so. Secondly, because the discussion demands that the reasoning be conceptual and substantial, not exclusively constrained by the obtaining of a result that has overcome a certain probabilistic threshold or not. Obviously, the objective is not to discuss all the possible results, but the relevant ones according to the questions posed, whether or not they are associated with a statistically significant result (example 28, Roqueta and Clemente, 2010).

Example 28

“On the one hand, it is important to note that the two groups of children with SL present an execution similar to that of their peers by age in the Emotional Stories task, which helps to affirm that they seem equally capable of inferring mental states from third parties. people when the context information is accompanied by visual aids that complement the verbal information, offering a static support (Im-Bolter, Johnson and Pascual-Leone, 2006). In the same way, they are also competent when detecting humour in the task of graphic jokes, which indicates that certain necessary representational skills related to the TOM—such as establishing analogies between parties, deducing their relationship and activating the relevant schema in the drawing (Puche-Navarro, 2004)—they seem not to be deficit when the task is presented to them in a way”.

Example 29

“In none of their verbal or non-verbal messages have these progenitors shown a stereotyped preconception, which would make us suppose that this equity is also perceived by their children, thus not assuming their gender a barrier within the family, at least in an explicit way in the case of these students. However, in the whole of the research and in the work in discussion groups with teachers and students it has been found that they are mostly directed towards technological studies and they aim towards activities that involve helping others, so that the gender stereotype is still far from being eliminated (Rodríguez, Inda and Peña, 2014; Inda, Rodríguez and Peña, 2016; Rodríguez, Peña, García-Pérez, 2016)”.

3) Discuss secondary or additional results. Now it is time for the objectives or the secondary hypotheses. Take advantage of this space to highlight the results that do not agree with the literature and propose possible explanations. Explain those results that you consider relevant, even if they have not achieved statistical significance, as already mentioned. It may be relevant to explain an effect that could mark a possible line of research despite not reaching the established statistical threshold. If this effect connects to your main objective in some way, mention it.

4) Explain the limitations of your study. There is no perfect study. You need to mention the limitations that your work presents, but also discuss the subject. Talk about the representativeness of the sample, the weaknesses of the design, the limitations of the measures you have used, etc. Argue how these or other problems may affect, limit or bias inferences (chapter 8, Pyrczak, 2005).

Bibliography

Take care with the bibliography! Do not simply export what was in the introduction. Although it is inevitable that you will gather the most relevant quotes in the discussion and those which have already been described in the introduction, you should always provide new bibliographic material. And this must conform to the specificity required by the results. Try not to exhaust all the quotations available in the introduction. Do not “fire them all out” there. Consciously keep some for the discussion. Think that it is not usually necessary to base a concept on a long list of citations. It is usually enough to cover an idea with two or three. Take advantage of the others for the discussion and guarantee their, as mentioned, specificity and relevance. If you have recent quotes from the last few years, make use of them here preferably. This will bring a sense of topicality to your study (example 29, Fernández-García, 2016).

Now, if you consider that, despite the limitations mentioned, these could have a relative impact or less than what could be assumed thanks to some strategy that has been used in your study, explain it. To conclude this paragraph in this way will serve to relativise the perception that you are facing an insurmountable problem (example 30, Bachiller *et al.*, 2015).

Example 30

“This preliminary study has several limitations to take into account. First, no control group was used to determine whether the results obtained with respect to motivation at admission, retention in treatment and subsequent abstinence are due to participation in the therapeutic group. However, the relapse rate found in the participants in the motivational group (48.8%) is similar to that found by Loeber *et al.*, (2009) at two months of follow-up: 42.4% compared to the control group (68.3%). Furthermore, the availability of a small sample size and the high percentage of women in the sample makes it difficult to generalise the results to the population consuming substances, which is normally distributed with a higher percentage of men (EMCDDA, 2012). Being an open-ended therapeutic group, it was not possible to protocol sessions, although this more flexible format allowed for the adaptation of the treatment to the context of the unit with constant admissions and additions. Another possible limitation is that no laboratory parameters were used in the measurement of abstinence, due to data protection regulations since the subjects belong to different centres; however, it has been found, in other investigations, that these parameters do not add greater veracity to the information (Babor, Steinberg, Anton and Boca, 2000)”.

5) Explain future lines of work. Your results may open lines of study that have not been explored so far. Argue them. Make recommendations on what should be done from now on. The key to this paragraph is to express the need to continue working. If your study invites you to explore new lines of work or have to reconsider what has been done so far, explain it. Do not simplify this paragraph by mentioning only that you have to investigate more, because this is obvious. Explain the future lines of work and where they should be directed (example 31, Bachiller *et al.*, 2015).

Example 31

“From these results different lines of research are derived. In future studies, in addition to measuring the motivational stage (DiClemente, Schlundt and Gemmell, 2004), more implicit cognitive aspects should be considered, for example, nuclear beliefs related to addiction (Martínez González and Verdejo García, 2012). Furthermore, the most basic components of satisfaction, with therapy or with the therapist, and their influence on the efficacy of psychological treatment in drug addiction, should be investigated in order to improve such interventions. Finally, these data have relevant clinical implications, since they demonstrate the importance of offering psychosocial treatment added to pharmacological treatment from the first phases of the intervention with addicts with the aim of improving their effectiveness (Berner *et al.*, 2008; Loeber *et al.*, 2009; Stetter and Mann, 1997)”.

6) Reach a conclusion. Recapitulate and summarise what was most essential in your work, but without repeating structures that have already been used in the introduction or in previous parts of the discussion. What would be the fundamental message of the study? Add the most relevant contribution that has emerged thanks to the outcomes obtained. Formulate this paragraph by trying to give a sense of relevance. One paragraph should suffice and should not be excessively extensive. See the summaries of examples 32 (Roqueta and Clemente, 2010) and 33 (Valero *et al.*, 2017a).

Example 32

“We conclude by noting that our data supports the possibility of isolating or differentiating a subtype of SLI with greater communication problems. The difference is focused on features such as less affectation in phonetics, greater semantic difficulties of high processing, and greater difficulties in solving pragmatic and mentalistic tasks with complex contextual implications”.

Example 33

“In the population of people who have lost their driving license due to driving violations, the most prevalent diagnoses are, in this order, substance and alcohol abuse/dependence, ADHD, depression and anxiety disorders. ADHD, which affects this population approximately six times more than expected in general adult population, was revealed as the most discriminant clinical condition for risky behaviours and recidivism of traffic violations. The results of the current study reveal the high prevalence of psychopathology and the high comorbidity of disorders, especially when substance abuse or dependence is involved. Additionally, the current results suggest that addressing psychopathological disorders may be a key factor when considering the outcomes of malfunction on the road. If these disorders are not adequately identified and treated, the traditional punitive measures and/or learning strategies, also frequently focused only on substance use, would probably lead to partial results that are not maintained over time”.

4.1.6. Bibliography

The bibliographical section is the space of the report where all the literature that has been cited in the text must be collated, regardless of the documentary source from which it was found. Every citation in the body of the text must have its reference at the end of the document. All collated references must have, at least, a citation in the body of the text; remember that a citation can be repeated, while a reference cannot. The most important aspect that must be taken into account has to do with the form. And there are different styles of referencing; in fact, there are many. At the end of this module, in the section on ethical and formal aspects, this aspect is addressed.

4.1.7. Annexes

A report cannot become an encyclopaedic text, so its length must always be measured. The length can be determined, for example, by a department of a university, or by a publisher, in the event you want to publish a report in the form of an article. If you accept this last option, you should know that, depending on the journal, texts between 4,000 and 5,000 words in general are usually accepted, excluding the bibliography. This figure is what could be taken as a reference.

However, sometimes a report requires having to generate a broader text. Maybe because you have to add content that has a minor relevance, in accordance with the main objectives of the report, but which are necessary for the correct understanding of the project. Often these contents that must be incorporated have to do with aspects about the method, such as explaining, for example, the contents of a pedagogical intervention in certain detail if there is not enough space in the procedural subsection, or else to report analyses that

are numerous or secondary or, as in the case of a qualitative methodology, to report, for example, parts of the material used that can hardly have a place in the body of the report (results of interviews, the interviews themselves, etc.).

5. Ethical and formal aspects

As mentioned, it is essential that you cite all your sources of information.

Avoid copying and pasting literally fragments of a text into the report. Note that there are currently computer resources to carry out massive searches within text. Many journals or universities use them frequently. The problem of plagiarism is an issue that is a concern, and is increasing, due to the avalanche of resources and information available. The penalties are usually severe.

If what you want, however, is to highlight the literality of a fragment of text, do not forget to quote it. In this document, for example, you have encountered this type of citation many times. However, unless you are writing a document that has a pedagogical purpose, it is necessary to minimize the presence of this type of strategy when writing a research report. What is expected in this type of document is that it develops the available information, rather than carrying out a compilation of contents.

If you consider that the idea you want to express is duly expressed in a paragraph that you are reading—and it is not advisable, as stated already, to copy it literally—a resource that is within your reach is to paraphrase. You can use connectors that have not been used in the original structure, modify the order of presentation of key concepts, modify relevant words, for example, with synonyms, etc. They are resources that help to give a different dynamism of the same text without lapsing into copying it. In other words, it consists of expressing the same (or almost the same thing) using alternative resources. This will be, in fact, the resource that you will probably use most frequently when drafting, at least for the first part of the introduction section, for example, and partly also for the discussion. In this case you will also have to properly cite each fundamental element that you express. You have done the job of searching, selecting, elaborating and summarizing the information, but the ideas on which each of the concepts that you relate are based on previous documentary sources. They have to be quoted.

As has been seen, the citation becomes the connector between the text and everything that has been developed so far. In addition, this citation will give credibility and, it is also worth saying, authority.

In the same way that the conventions on the way of quoting have to be taken into account, one must also think about other relevant formalities. We have spoken, for example, about how the tables that are included in the results, the figures (like a graph), etc. should be. From all these aspects we have provided examples. Observe, however, that although most scientific reports end up talking about the same contents (introduction, method, results...), they do not always use the same labels. In some documents you will find the term *“introduction”*, while in others it will be *“background”*, for example: In some documents you will find subsections that do not exist in others, as in the case of conclusions.

As a general rule, for the writing of the report you have to find out if a style guide is proposed where it should be valued or published. If specific rules are not specified, based on those proposed by some known references, such as for example, the APA, which will give you specific rules on how all formal aspects of the document should be resolved. What is explained in this manual is basically adapted to this regulation.

How has the quote been written in the text?

Citation rules (also known as referencing standards) are a set of very standardized rules that determine how a citation will be presented in the text and how the reference on which it is based should be collected (what we can properly describe as referencing), usually at the end of the text. You have to know, however, that there are many ways to do it. And none of them can be considered universal, although some are used more often than others. One of the forms of citation that has some cross-over between disciplines such as psychology is that of the rules of the American Psychological Association (APA), which is already in its sixth edition. The internet is full of explanations, summaries and examples of how to quote and reference following this normative model. We recommend that you visit the library space (“Information resources, citations and bibliography”) of the Autonomous University of Barcelona’s (UAB) website. You will find a compilation of several citation styles (including the APA), the areas that are usually covered and the basic and updated standards that characterise them.

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