

A guide for naming research studies in Psychology¹

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ABSTRACT. In this work, the classification system for research methods in Psychology previously published by the authors is amplified and reviewed. We establish some cues for guiding its use and make some considerations on its utility. Based on classification of the research plan, in a first level the system is composed by three main groups: a) theoretical studies, b) empirical quantitative studies, and c) empirical qualitative studies. Within the first group two types are included, classical reviews and meta-analysis. Within the second, there are seven different types: observational descriptive studies, survey descriptive studies, experiments, quasi-experiments, *ex post facto* studies, single case experimental studies, and instrumental studies. The third group includes ethnography, case studies and action research. We present the main characteristics for each type and describe some keys which permit to identify their subtypes. All of them are illustrated with actual publications. The classification system we propose here will be used as model for research reports in order to be published in this journal.

KEYWORDS. Methodologies classification. Research methods in Psychology. Theoretical study.

RESUMEN. En este trabajo se revisa y amplía el sistema de clasificación de las metodologías de investigación en Psicología previamente publicado por los autores. Se

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establecen pautas para guiar su utilización y se presentan algunas reflexiones sobre su utilidad. El sistema está basado en la lógica del plan de investigación. En un primer nivel, se compone de tres grandes grupos: a) estudios teóricos, b) estudios empíricos cuantitativos y c) estudios empíricos cualitativos. El primer grupo se descompone en estudios clásicos de revisión y estudios meta-analíticos. El segundo grupo se desglosa en siete clases: estudios descriptivos mediante observación, estudios descriptivos de poblaciones mediante encuestas, experimentos, cuasi experimentos, estudios *ex post facto*, experimentos de caso único y estudios instrumentales. El tercer grupo queda desglosado en etnografía, estudio de casos e investigación-acción. Se presentan las características más importantes de cada clase de estudio y, dentro de ellas, las claves que permiten identificar cada una de sus posibles variantes. Siempre se ilustran con investigaciones publicadas. El sistema de clasificación aquí propuesto se utilizará como modelo para los informes de investigación que se envíen a esta revista.

PALABRAS CLAVE. Clasificación de metodologías. Métodos de investigación en Psicología. Estudio teórico.

RESUMO. Neste trabalho revê-se e amplia-se o sistema de classificação das metodologias de investigação em Psicologia previamente publicado pelos autores. Estabelecem-se pistas para orientar a sua utilização e apresentam-se algumas reflexões sobre a sua utilidade. O sistema está baseado na lógica do plano de investigação. Num primeiro nível, compõe-se em três grandes grupos: a) estudos teóricos, b) estudos empíricos qualitativos e c) estudos empíricos qualitativos. No primeiro grupo incluem-se dois tipos, estudos clássicos de revisão e estudos meta-analíticos. No segundo grupo incluem-se sete tipos diferentes: estudos descritivos mediante observação, estudos descritivos de populações mediante inquéritos, experimentais, quase experimentais, estudos *ex post facto*, experiências de caso único e estudos instrumentais. O terceiro grupo inclui a etnografia, estudo de casos e investigação-acção. Apresentam-se as características mais importantes de cada classe de estudo e, dentro delas, as chaves que permitem identificar cada uma de suas possíveis variantes. Todas são ilustradas com investigações publicadas. O sistema de classificação aqui proposto será utilizado como modelo para os relatórios de investigação que venham a ser enviados a esta revista.

PALAVRAS CHAVE. Classificação de metodologias. Métodos de investigação em Psicologia. Estudo teórico.

Introduction

After some years using our proposal for classifying research methods in Psychology (Montero and León, 2002, 2005), the editor of this Journal invited us again to review it, writing a new article. In this new paper we present some modifications of the classification system supported on which we have already included in the last edition of our *Handbook on Research Methods* (León and Montero, 2008). In this new version we bring the distinction between qualitative and classical (or quantitative) studies to the beginning. We also make more detailed categories adding information in those parts of especial difficulty. The new version includes twenty nine new references to research studies published in English or Spanish.

Before to begin to exposure the system of classification, we consider of relevance to briefly remember some of the general reflections we presented in the previous version (Montero and León, 2005). The first regarded to the fact that the main objective of our proposal for classification of research studies in Psychology was not epistemological (in the sense which authors as Hempel, 1965, illustrated), but just methodological. That is, we thought our proposal in terms of creating a system for increasing reliability of document analysis and not in terms of to establish a system for ontological classification of research methods. In this sense, the whole system is open to reformulation. We will really appreciate any kind of comment in this direction (and we grateful to those colleagues, researchers and students who already gave us their suggestions).

The second general reflection was related with the criteria used to create the system. Although methodology can be articulated through different levels (epistemology, research design, techniques for collecting data, strategies for data analysis), we organized the logic of the system mainly around the research design. In this new version it is also the case but we should precise two aspects: a) epistemology is now the key concept to use the classification in its first hierarchical level, and b) given the high flexibility of qualitative designing, within the research report of this type of studies it should be more important to carefully inform about the process of collecting and analyzing data (see AERA, 2006).

Finally, we would like to insist again on the importance of giving precise information regarding the process of selecting participants and/or assigning them to the research groups. To refer just to the random nature of such process can be non sufficient and, in many times, confusing.

In addition to recalling our past general reflections, let us to make a new general remark. This is related with our silence on mixed methods (see, for example, Tashakkori and Teddlie, 2003). Researchers whom like to use this category in order to name their way of dealing with their studies designing are interested in breaking down the dichotomy between quantitative versus qualitative methodologies. With no deeper comments on this issue, we would like to argue for not including this label within the first hierarchical level of our classification. The main reason for excluding it is because the verbal form "mixed" refers to combining research designs, techniques for data collection and strategies for data analysis. But it is very difficult to find out a published study which includes a mixture of quantitative with qualitative designs. So we think that those researchers using the conceptual umbrella of "mixed methods" would be also able to use our system for naming their empirical studies.

Let us now to present the definitions of the different types of studies organized within three big clusters, some of them including until three more subordinated levels.

Theoretical study

In this category, it will be included every work in which the authors neither provide their own original data nor present re-analysis from already collected or published data (in this case, the study will be classified following the criteria applied within the rest of this guide). That is, a study will be considered as theoretical when only presents theoretical advances, reviews, comparative and critical analysis of theories, models and/or empirical evidence within a specific field.

Classic

In this category should be included studies which make the review without using any type of statistical support for their thesis. Vg.: Corraliza (2001), Pérez (2001), Roth and Lee (2007), Virués and Haynes (2005).

Meta-analysis

Those review studies which use different estimators for effect size in order to analyze the accumulated evidence for an specific hypothesis within a research topic are called meta-analysis. Vg.: Springer, Stanne, and Donovan (1999), Vargas, Gambara, and Botella (2006).

Empirical study, quantitative methodology

Within this cluster of categories should be included all those studies in which the authors present their own original empirical data, obtained within the positivistic epistemological tradition.

Descriptive study using systematic observation

This category is formed by studies using systematic observation through an arbitrary code system with a descriptive objective, not including any type of previous hypothesis. If the latter were the case, the study should be classified as *ex post facto*.

- Naturalistic observation. The research is carried out within the natural context in which the phenomena appears and the researcher does not make any type of intervention on it. Vg.: Berk (1986), Piñar, Caro, and Coscollá (2001).
- Structured observation. The research is carried out within the natural context in which the phenomena appears, but the researcher introduces some modifications in order to increase the probability of phenomena occurrence. Vg.: González and Palacios (1990), Winsler, Díaz, McCarthy, Atencio, and Chabay (1999).

Descriptive study of populations through survey research, probability sampling

In this category, will be included all those studies which using survey with a descriptive goal –the description of a particular population–, with no previous hypothesis. If the latter were the case, the study will be considered as *ex post facto* and the researcher should be inform about the use of the survey in the section of materials.

- Cross-sectional. Description of population is made through a unique temporal point. Vg.: Nuevo, Montorio, Márquez, Izal, and Losada (2004), Pereira and Smith (2003).
- Longitudinal. Description of population is made through comparisons along different temporal moments, by using different representative samples of participants for each (successive independent samples) or by using the same group along the time (panel design). Vg.: Currie and Thomas (1999), Oficina del Defensor del Pueblo (2007).

Experiments

For classifying a research study as experimental should be necessary that at least one of the independent variables had been manipulated by the experimenter.

- Experiments with different groups (between subjects). In order to testing the effect of independent variable, at least two different experimental conditions are implemented, and each individual participant in the experiment is randomly assigned to one of them. With this strategy, other potential causal factors are balanced between groups and its efficacy increases with larger groups (It is very important to give details on the way of making the assignment. Just naming it as "random" is not enough guarantee).
 - One independent variable design, random groups design. This research plan consists in the manipulation of one independent variable creating as many random groups as experimental conditions. Vg.: Díaz and Vallejo (1987), Tifner, Zanin, and De Bórtoli (2003).
 - One independent variable design, random groups plus a blocked variable. This is similar to the previous research plan but it includes a controlled variable by creating random blocks (groups of participants with similar value in the controlled variable) (It is convenient to make and inform of the size effect of the blocked variable). Vg.: Flórez-Alarcón and Rodríguez (2001).
 - One independent variable design, random intact groups. In this category should be included this type of experiments –one independent variable design- in which the participants were not individually assigned to the experimental conditions. They were previously included within a group (at work, at school) so the researcher randomly assigned the whole (intact) group as a unit. Vg.: Sáenz de Castro and León (1998).
- Experiments with the same group (within subjects). In this case, participants receipt all the experimental conditions in all designed orders (complete design) or just in one of them (incomplete design). The efficacy of this experimental strategy rests on controlling accumulated practice effect given the tasks repetition, so it is necessary to indicate the way in which the researcher proceeded.
 - One independent variable design, within subjects, with a single random order (complete). In this experimental plan, the nature of independent variable permits many repetitions for each experimental condition and these repetitions has been presented in a single random order to all the participants. Vg.: Craik and Tulving (1975).
 - One independent variable design, within subjects, with block randomization (complete). The nature of independent variable permits a moderate number of repetitions. In order to be successful for practice effect controlling, the order in which the task are presented to participants were made by randomized blocks, with all experimental conditions within each block. All participants repeats all block of task in the same order (complete). Vg.: Sackeim, Gur, and Saucy (1978).
 - One independent variable design, within subjects, with a counterbalanced order AB,BA (complete or incomplete). The nature of independent variable

makes impossible task repetition for the two experimental condition (A, B). Participants are randomly assigned to the two orders, the sequence AB and the sequence BA (incomplete design). When the experimenter had used the complete design, by applying the sequence ABBA, she should justify the linear nature of practice effect on the dependent variable. Vg.: Rasinski (1990).

- One independent variable design, within subjects, with Latin Square (incomplete). The nature of independent variable, with more than two experimental conditions, make impossible task repetition. Participants are randomly assigned to one of the orders designed to configure a Latin Square. Vg.: Erber (1991).
- Factorial experiments. In this category should be included all experimental designs with more than one independent variable in which the different variables levels are combined in a systematic manner. This would be, for example, factorial complete, nested, with group reduction, etc. and should be informed within the design label. In addition to the number of variables and their levels, the researchers will indicate the way of studying each variable, between or within subjects, as well as the presence of non manipulated variables, if it were the case. Vg.: Diges, Rubio and Rodríguez (1992), Montero and De Dios (2006), Olivares, Rosa, and Olivares (2006).

Quasi experiments

Within this category and the following (*ex post facto* studies) it has been included all those studies in which the researcher has the objective of contrasting a causal relationship but the conditions of work implies important limitations to be successful. In this first category we include intervention designs applied in natural settings where is not possible to make random assignment or to control the order in which the tasks are presented. There are variations of this type of studies that we present as follow.

- Pretest-posttest. The researcher measures the dependent variable before the intervention starts and after it is concluded. We present some subtypes of this category.
 - Pretest-posttest, one group. The intervention has been applied only to one group. It is necessary that the researcher make strong arguments about the incidence of potential threatens to this very weak design. Vg.: García, Rosa, Montero y ETIEDEM (1990), Riveros, Cortázar, Alcázar, and Sánchez (2005).
 - Pretest-posttest, two groups, including a nonequivalent control group. In this case the two measures of the dependent variable are taken from two different groups: the group which receipts the intervention and another similar group, not randomly created, which do not receipt the intervention. (This type of group is called as "nonequivalent" because it has not the guarantees of those randomly created). Vg.: DeCharms (1976), Labrador, Fernández, and Rincón (2006).
 - Pretest-posttest, two groups, with a nonequivalent control from another cohort. This design increases control by using as control a nonequivalent group from a previous cohort. The researcher should indicate the institutional conditions that justify the potential equivalence between the two groups. Vg.: Minton (1975).

- Pretest-posttest, one group, with nonequivalent control in a second dependent variable. When it is not possible to use a nonequivalent control group, the researcher can use a second dependent variable as comparison. The second variable has to be not connected to the main dependent variable. Vg.: Broadbent and Little (1960).
- Posttest-only designs. These plans fit to situations where measures can be taken only after the treatment has been applied; in some occasions the researcher is not the one who made the intervention. There are different variations, some of them are as follows.
 - Posttest-only design with two groups, including a nonequivalent control group. The researcher has utilized the simplest of these designs: one group treated and another one was used as nonequivalent control; both of them were measured at the same time (posttest-only). Due to the weakness of the design, the author should justify the equivalence between the two groups. Vg.: Feldman and McKinlay (1994).
 - Posttest-only design with two groups, including a nonequivalent control from another cohort. This is a variation of the previous one, where the researcher has incremented the similarity between experimental and nonequivalent group by means of selecting both groups from the same institution, but different cohorts. Vg.: Minton (1975).
 - Posttest-only design with duplicated groups, all measured at the same time. This plan is the same of the one of posttest-only design with two groups, including a nonequivalent control group, where both groups have been split. It should be shown that results of the two experimental sub-groups are equal and simultaneously different from the nonequivalent sub-groups. Vg.: Ball and Bogatz (1970).
 - Posttest-only design with, duplicated groups, including a nonequivalent control from another cohort. In this type of study, similar to the previous one, the nonequivalent control sub-groups belong to a cohort that close to the one of the experimental. Vg.: Ball and Bogatz (1970).
 - Posttest-only design, with two or more treatment's levels. In this case, as the intervention has two or more levels, the researcher has used one group for each condition. As usual, the similarity of the groups is the key for valid conclusions. Vg.: Seaver (1973).
- Interrupted time-series designs. The nature of the dependent variable has allowed to the researcher to take several measures before applying the treatment, and also several afterwards. Different designs can be followed under this strategy.
 - Interrupted time-series design with one group. Only one group of participants has been measured before and after the intervention. Vg.: Ross and White (1987).
 - Interrupted time-series design with two groups, including a nonequivalent control group. In this context the author was able to use a nonequivalent control group who was measured the same number of times as was the experimental. Vg.: McSweeney (1978).

- Interrupted time-series design with one group, using a nonequivalent control in a second dependent variable. More control has gained in this "only-one group design" by adding a second dependent variable; this one should not be affected by the treatment applied to the main dependent variable. Vg.: Ross, Campbell, and Glass (1970).
- Regression discontinuity designs. The intervention has been produced over a cut point on the pre-values of a sample and the evaluation of effectiveness has analyzed on the post-values, around an interval of set point. Vg.: Seaver and Quarton (1976).

Ex post facto studies

With this label are named those studies in whose the independent variable could not be manipulated. Some authors (Heiman, 1995) name them "correlational studies" in reference to the way for their data analysis. Here we have taken this other option (Dunham, 1988) because the useful methodological distinction between "prospective" and "retrospective" categories developed under the *ex post facto* approach.

- Retrospective studies. This qualifier is assigned to a study when the researcher begins by registering the values of the dependent variable and afterwards those of the independent one. The following retrospective plans can be used.
 - Simple retrospective design with one group. The author has begun by selecting the participants due to the same singular characteristic (clinical syndrome, personal circumstance, etc.). After a possible explanation for this characteristic has been formulated, potential independent variables are registered. Vg.: Fernández (1994).
 - Retrospective design, with two groups, including a nonequivalent control group. The previous design is improved when, as this case, a second group is added, with many similarities to the key group, but with null value on the target characteristic. The explanation proposed for the nature of the characteristic should account for both groups. Vg.: Shafii, Carrigan, Whillinghil, and Derrick (1985).
 - Retrospective design, with one group and multiple measures. In this plan the researcher has selected a numerous group of participants with the target values on the dependent variable and also a great variety of scores on potential explanatory variables. Vg.: García, Fernández-Ballesteros, Montero, and Heiby (1995), Gómez, Luengo, Romero, Villar, and Sobral (2006).
 - Bibliometrical historiographical studies. A covariation produced in the past *(ex post facto)* is been explaining by means of documents, instead of people. Vg.: Callejón (2003), Guerra (2003), Montero and León (2001).
- Prospective studies. These studies begin by registering the values of an independent variable and afterwards, measuring the dependent one. The gap between both registers should permit that the action of the independent one has taken place. As can be seen, there are various designs under this scope.
 - Prospective, one independent variable, simple design. All participants are selected and grouped because their value in the independent variable. After the appropriate

lapsus, the groups are compared in the dependent variable. Vg.: Fernández-Montalvo *et al.* (2004), López and Gil (2001).

- Prospective, more than one independent variable, factorial design. Participants have been selected because of a particular combination of characteristics, as the author has planned; in order to fill the groups formed by the combination of levels of the independent variables under study. Finally, once independent variables are produced their effect, the dependent variable is measured. Vg.: Baile, Guillén, and Garrido (2002), Matud, García, and Matud (2002).
- Prospective, one group, multiple measures design. The plausible influence of a set of variables has been tested in a large group of participants, before the appearance of the dependent variable. Vg.: Besteiro *et al.* (2004), Borrayo, Guarnaccia, and Mahoney (2001).
- Prospective design, with more than one causal step. A group of independent variables have been researched in, at least, two causal steps; in consequence, some variables are dependent and independent at different moments of the sequence hypothesized. Vg.: Covington and Omelich (1979), Montero and Alonso (1992a).
- Developmental designs. Time, a factor not under manipulation, is studied as independent variable in developmental researches. Here also there are several modalities under this approach.
 - Developmental transversal design. Different groups of participants –distinct ages- have been compared at the same moment in time. Vg.: Flavel, Beach, and Chinsky (1966).
 - Developmental longitudinal design. The same group of individuals has been studied along a period of time. Vg.: Baghdadli *et al.* (2007), Shum, Conde, and Díaz (1992).
 - Sequential design. Change of behavior associated to age has been registered, combining a longitudinal view across two (or more) different cohorts. Vg.: Schaie and Herzog (1983).

Single-subject experiments

Inside this category should be included all experiments using only one subject as experimental object and also him/herself as control. We have collected eight possibilities.

- No-reversal design, AB. In this plan it is not possible to retire the treatment.
 Vg.: Arco, López, Heilborn, and Fernández (2005), Contreras and Juárez (2003), Montorio, Fernández de Trocóniz, and López (1998).
- Reversal design, ABAB. This is the basic reversal design, with four phases, finalizing with an intervention phase. Vg.: Heard and Watson (1999), Martin, Goodrich, Beutler, and Firestone (2001).
- Design with treatments, ABACA. Two different therapies have been tested in the same patient. (B and C represent the different treatments). Vg.: Wincze, Leitenberg, and Agras (1972).
- Design with three levels of treatment, ABAB'AB". Possible differences of three increasing levels of the same intervention have been tested in this case. Vg.: Phillips (1968).

- Design to test the interaction of two treatments, A-B-A-C-A-B-BC-C. The author researched, in the present situation, the existence of interaction between two treatments (B and C). (Other possibilities for testing interaction should present interventions and reversal of each treatment plus a presence of both treatments together.) Vg.: Bernard, Kratochwill, and Keefauver (1983).
- Multiple-baseline, several behaviors, the same patient. Under this strategy the author begun to register several behaviors, simultaneously, and, at different moments, applied an intervention to each one of the conducts. Comparison between treated and base-line series provides the effectiveness of the intervention. Vg.: Hall, Cristler, Cranston, and Tucker (1970).
- Multiple-baseline, several patients, the same treatment. Several patients –similar-received the same therapy at different moments, so one being treated could be compared to another one that remained in base line. Vg.: Fernández et al. (1997).
- Multiple-baseline, several contexts, the same treatment. In that design, the efficacy
 of the intervention was tested in different contexts, using the same strategy of
 the previous plans. Vg.: Hall *et al.* (1970).

Instrumental studies

The development of new procedures, apparatus, instruments or tests, as well as their psychometric properties, are included in the present category. Vg.: Gibbons, Flores, and Mónico (2004), Montero and Alonso (1992b), Servera and Cardo (2006).

Empirical qualitative studies

This set of categories comprehends those of studies produced under the epistemological view of subjectivism (phenomenological, interpretative or critic approaches). In general, all empiric works done from the participants perspective.

Ethnography

The research studies a human group in which the responsible take an active part in the main group. Empiric evidence is collected by unstructured techniques, especially participant observation. Vg.: Burgois (2003).

Case study method

Descriptive strategies referred to a unique element: a person, a group, an organization, etc.

- Intrinsic case study. The researcher does not select the case, just it happens to find it. Vg.: Sacks (1987, pp. 138-140).
- Instrumental case study. The researcher selects the unit, in attendance to its prototypical characteristics. Vg.: Shaw (1931), Stake (1998, ch. 10).
- Multiple case study. Several prototypical cases are elected to illustrate some variants of the object under investigation. Vg.: Anyon (1981).

Action-research

A social context is studied in such a way that intervention –to improve the contextand the scientific description are sequenced in a spiral form. Vg.: Withmore and Mckee (2001).

Final guiding comments

As it has been said, the objective of this guide is that researchers have a conceptual system to organize their work in two senses. First, when they are planning a study, a question arises: What is the name of the strategy to accomplish what I want/can do for answering my research question? Secondly, at time of implementing they can wonder: What is the usefulness of knowing the name of my study design?

In order to answer the first question we should follow a chain of steps. Once it is clear that an investigation is going to be carried out, the responsible must think whether he/she wants to capture the perspective from the participants point of view or, on the other side, wants to elaborate a some testable theory about the behavior of the participants (in the wider meaning of the word). In the first case, he/she should select the best qualitative plan to achieve such an objective. In the second case, a quantitative work should be performed. When the interest is the full characterization of a phenomenon, a descriptive study is the answer. In the case of a cause-effect hypothesis, the best way to test it is the manipulation of the independent variable. If manipulation is not possible, the kind of study will be an *ex post facto* study. In case that the researcher can go further with manipulation, several controls should be checked: a) random assignment of participants, for inter-subjects designs, b) order control of the levels of the independent variable, for intra-subjects designs. Once fulfilled, the research is an experiment type; when these controls are not satisfied, the plan becomes quasi-experimental.

What is the benefit of the assignment a correct label to the study? In a humorous way we can answer that to be published here. The serious response is that, once properly categorized, it is possible to know the most probable threatens to the validity of the work, and, consequently, it would be feasible to eliminate them and stronger conclusions could be derived in that situation. Anyhow, as Shadish, Cook, and Campbell (2002) have pointed out, there is not an exclusive validity associate to a particular research plan; in every situation the researcher should discuss the particulars of his/her work.

Finally, as we have written in different places, we like to propose a simple rule: does the researcher what he/she can, but knows what he/she is doing.

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