

# Planning Questionnaires: Unifying Knowledge in Marketing Research and Psychometrics

## *Planejamento de Questionários: Unificando conhecimentos em Pesquisa de Mercado e Psicometria*

Gustavo Henrique Silva de Souza  
 Jorge Artur Peçanha de Miranda Coelho  
 Nilton Cesar Lima  
 Josmário de Albuquerque Silva  
 Germano Gabriel Lima Esteves

### ABSTRACT

In this study, practical specifics on developing questionnaires for technical and/or academic purposes are presented, considering the functionality and contextualization in administration research. From this, it was proposed to theoretically deepen the questionnaires operationalization as research instruments. Based on a bibliographic study, we discussed the proper planning of instruments for sorting, construction, application (survey) and analytical possibilities, considering the concepts of reliability, validity, and precision. Examples from the literature were used to demonstrate the useful application of questionnaires in managerial contexts. As a contribution, this study advances in the compilation of knowledge in psychometrics and marketing research, which enable a broader spectrum on the usability of instruments for decision making with greater methodological robustness.


**Keywords:** Questionnaires. Instrumentation. Scales. Statistics. Research Methods.


### RESUMO

Neste estudo, são apresentadas especificidades práticas para a construção de questionários para fins técnicos e/ou acadêmicos, considerando a funcionalidade e a contextualização com a pesquisa em administração. A partir disso, propôs-se aprofundar teoricamente a operacionalização de questionários como instrumentos de pesquisa. Com base em um estudo bibliográfico, discutem-se o planejamento adequado de instrumentos para a triagem, a construção, a aplicação (levantamento) e as possibilidades analíticas, considerando os conceitos de fidedignidade, validade e precisão. Foram utilizados exemplos da literatura para demonstrar a aplicação profícua de questionários em contexto gerenciais. Como contribuição, este


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Gustavo Henrique Silva de Souza   
 gustavo.souza@fmg.edu.br  
 M.Sc. in Psychology – Universidade Federal de Alagoas  
 Mestre em Psicologia - Universidade Federal de Alagoas  
 Teófilo Otoni/MG - Brazil

Jorge Artur Peçanha de Miranda Coelho   
 jorge.coelho@laccan.ufal.br  
 Ph.D. in Social Psychology – Universidade Federal da Paraíba  
 Doutor em Psicologia Social Universidade Federal da Paraíba  
 Maceió/AL - Brazil

Nilton Cesar Lima   
 cesarlim@yahoo.com  
 Ph.D. in Business Administration – Universidade de São Paulo  
 Doutor em Administração pela Universidade de São Paulo  
 Uberlândia/MG - Brazil

Josmário de Albuquerque Silva   
 josmarios.silva@gmail.com  
 Ph.D. Student in Educational Technology – The Open University  
 Mestre em Modelagem Computacional de Conhecimento - Universidade Federal de Alagoas  
 Milton Keynes - England

Germano Gabriel Lima Esteves   
 germanoesteves@univ.edu.br  
 Ph.D. Student in Social and Organizational Psychology – Universidade de Brasília  
 Doutorando em Psicologia Social, do Trabalho e das Organizações - Universidade de Brasília  
 Rio Verde/GO - Brazil

**RESUMO**

estudo avança na compilação de conhecimentos em psicometria e pesquisa de mercado, que possibilitam um espectro mais amplo para a usabilidade de instrumentos para a tomada de decisão com maior robustez metodológica.

**Palavras-chave:** Questionários. Instrumentação. Escalas. Estatística. Métodos de Pesquisa.

## Introduction

The fundamentals for designing an investigation, whether for addressing academic or business issues, are implicitly associated with instrumentation and specific methodology (COOPER; SCHINDLER, 2016; POZZEBON; BIDO, 2019). Moreover, the integration of previous research results with theoretical-empirical elements in the consolidated literature precedes the scope of the object of investigation (TONELLI; ZAMBALDI, 2018; SNYDER, 2019).

Accordingly, when the literature is not sufficiently complete and comprehensive, or its basis is not adequately systematized, empirical research is required (see, SOARES; PICOLLI; CASAGRANDE, 2018). Thus, the research process requires specific tools that meet the empirical research objectives, such as questionnaires and interviews or observation scripts.

Specifically, in studies that encompass the investigation of phenomena linked to social, technological, and human interaction from different contexts of health, humanities, and applied social sciences, the use of questionnaires is predominant and extensively spread (GENES *et al.*, 2017; GIL, 2019; MARKUS, 2019). The questionnaire becomes a central data collection tool, whose theoretical-empirical treatment is a condition underlying its conception, and the implications of its use are a catalyst for discoveries (WILKINSON; GIBBS; WAITT, 2020).

In operational terms, a questionnaire is a tool that comprises a group of standardized and pre-established items, questions, or issues, whose purpose is to measure characteristics and/or attributes related to phenomena, people, processes, or organizations. Its fundamental assumption is the guarantee that technical-scientific aspects will be taken into consideration, aiming at the accuracy and precision of the research (MALHOTRA, 2011; HAIR *et al.*, 2014). Therefore, the development of a questionnaire is a rigorous and detailed process that comprises the writing, order-

ing, and presentation of items (also known as questions), which are compulsorily linked to the administration of the questionnaire itself and the idiosyncrasies of data collection procedures (OLSEN, 2015; GEUENS; DE PELSMACKER, 2017).

Several researchers only discuss the planning and development of questionnaires by focusing on the breadth of their applications (e.g., FINK, 2002; MOREIRA, 2009; VIEIRA, 2009; ZHANG *et al.*, 2017; BRACE, 2018). However, some operational and daily practice details are still unexplored or not clear enough.

This article aims to theoretically deepen the operationalization of questionnaires as research instruments, from a practical and functionalist perspective, to provide an integrated view among psychometrics and marketing research for the questionnaire development protocols. Considering the management research context – from individual and organizational diagnosis to market analysis –, the successful operationalization of questionnaires can promote research quality and reliable results. For this approach, a hypothetical case was proposed to demonstrate ways to plan questionnaires.

It becomes even more relevant when researchers (including professors, students, consultants, managers, and market analysts) are eager to access the options for developing and applying questionnaires through digital tools and online platforms, which complementarily bring facilities for data collection, tabulation, and analysis (STOET, 2017; MALHOTRA, 2018). This indicates an expansion in the dissemination and use of questionnaires as data collection tools, although the principles for assessing their instrumentation quality remain the same: reliability, validity, and objectivity (SHAUGHNESSY; ZECHMEISTER; ZECHMEISTER, 2012; HULLEY *et al.*, 2015).

Thus, this article is divided into four parts: (i) this Introduction; (ii) the Methodology section; (iii) Theoretical Analysis, which includes the designing and planning of questionnaires as research instruments, as well as basic notions of scaling and validity procedures; and (iv) the Final Considerations.

## Methodology

This study follows a bibliographic and documental research design by examining methods of planning, developing, and analysing questionnaires. It also explores

the objective and qualitative aspects of collecting and using secondary data. Gil (2019) explains that exploratory research aims at the development and clarification of concepts not yet sufficiently explored, which provides a basis for possible new knowledge about phenomena and their attributes.

For data collection from secondary sources, scientific papers, books, and relevant organizational webpages on the subject were used, especially those that specifically bring a functional look and complementary details to the research practice. The screening process was based on the keywords: “survey”, “research methods”, “scales” and “questionnaire development.” Further, we only included studies published between 2015 and 2020 that were available on the following platforms: Science Direct, Web of Science, SciELO, Google Scholar, Repositories, Institutional Database, and Google.

This study will present the planning for the most varied types of questionnaires, which will allow guiding the researcher to the best utilization protocol. Besides, suggestions on the planning and development of questionnaires were raised, predominantly basing on the authors’ experience and the literature (which expresses the state-of-the-art in the investigated subject).

Finally, a hypothetical case is presented that demonstrates contexts relating to planning and developing questionnaires. Thus, comparative advancement is made possible by evaluating the technical formulation parameters and by guiding previous knowledge within the research process.

## Theoretical Analysis

### QUESTIONNAIRES AS INSTRUMENTS OF DATA COLLECTION

In clinical, educational, and organizational practice, most of the empirical research whose results are assessed through the analysis of primary data (raw data collected by the researcher) comes from the application of questionnaires (RATTRAY; JONES, 2007; HAIR et al. 2019). However, beyond the academic sphere, the robustness and validity of research results depend on the quality of the measurements. The results of a survey may become invalid if the questionnaire has been improperly prepared. Since there are surveys that evaluate and describe characteristics of phe-

nomena or attributes from participant perspectives, “for them to be useful, questionnaires must produce reliable and valid measures of demographic variables and individual differences on self-evaluation scales” (SHAUGHNESSY; ZECHMEISTER; ZECHMEISTER, 2012, p. 173).

As self-assessment scales, questionnaires are formally configured as research instruments of broad complexity and with predetermined objectives tailored to measurement needs. To illustrate, consider the formulation of questions (items) in a questionnaire that evaluates sociodemographic variables such as age, gender, education, and socioeconomic status. Although it seems easy to measure them, the possibility of identifying the socioeconomic status, for example, through a direct and open question (e.g., What is your socioeconomic status?) could bring unsatisfactory or incorrect answers. Those errors may occur if the respondent (1) does not know the meaning of the term “socioeconomic status”, (2) confuses “socioeconomic status” with “individual and family income”, or (3) underestimates or overestimates his/her socioeconomic status on a referential basis only by his/her neighbors and acquaintances.

Kamakura and Mazzon (2016) explain that the strata distinctions in socioeconomic status can be estimated from a series of linked criteria-variables. According to the authors, socioeconomic status is sustained through the concept of permanent income/home wealth, considering predominantly the consumption level, family composition, and geographical location. In this sense, a viable alternative for the measurement of socioeconomic status would be through the collection of information that ensures mapping this content indirectly. For example, by using the Criterion of Economic Classification of the Brazil (CCEB, in Portuguese, *Critério de Classificação Econômica Brasil*), developed by the *Associação Brasileira de Empresas de Pesquisa* (Brazilian Association of Research Companies) (ABEP, 2015). The CCEB uses a set of criteria that includes: (i) family income; (ii) comfort items (e.g., number of cars, TVs, rooms, etc.); (iii) education level of the head of the household (e.g., secondary school or higher education); or (iv) water supply (e.g., use of general distribution network). Here, the measurement approach is directly associated with the accuracy and precision of the analysis.

In addition to sociodemographic variables, questionnaires commonly seek to evaluate opinions (e.g., public surveys on the environment, food, etc.), intentions

(e.g., electoral research), beliefs, attitudes, and characteristics (e.g., marketing research, or psychological testing for clinical, organizational or academic purposes), among other aspects. Whatever the phenomenon to be evaluated is, collecting data in the real world and directly at the source is still the most effective way to access it, investigate it, draw safe conclusions, and make decisions (FIELD; HOLE, 2002).

Questionnaires, also called scales or self-assessment or self-reporting instruments, are tools with items (standardized questions) which are used to identify/map the judgment of an individual about a given phenomenon (e.g., everyday events or occurrences). They can also identify individual differences regarding some attribute or characteristic (e.g., leadership profile or job performance) in the form of a scale (SHAUGHNESSY; ZECHMEISTER; ZECHMEISTER, 2012).

Considering a hypothetical scenario, suppose that the human resources (HR) manager of a medium-sized company intends to investigate the reasons for low productivity among employees. To make an initial diagnosis, the HR manager decides to carry out an organizational climate survey and map different events of daily organizational life that vary in the dimensions of this construct (e.g., “leadership and organizational support”, “pressure/control for results”, and “cohesion among colleagues” – dimensions of the Organizational Climate Scale; for more details, see MARTINS, 2008).

In this scenario, the assessment focuses on the differences between the items of the aforementioned scale, and it is possible to infer which dimensions of the organizational climate may be negatively affecting productivity. In contrast, if the decrease in productivity has been identified in only one specific sector of the organization, it is possible to compare individuals according to the endorsement level on the organizational climate dimensions by identifying individual differences between sectors.

A questionnaire (instrument) capable of measuring organizational climate dimensions, for example, requires a meticulous compendium of techniques and criteria for its development, testing, validation, and standardization (consistency and objectivity of how tests are administered and scored). In our hypothetical scenario, for example, we may have the following problems: (1) Was the questionnaire developed based on a theory or at random? (2) Does the questionnaire use appropriate scaling, content, and semantics? (3) Was the questionnaire tested and corrected?

(4) Has the questionnaire been validated through psychometric and statistical procedures? (5) After the validation, were the scoring interpretation and standardization determined? In the case of Martins' instrument (2008), the answer is yes. However, for any questionnaire to be a discriminatory and qualified instrument to use in a survey, it must meet the same criteria.

## QUESTIONNAIRE DEVELOPMENT PROCESS

Therefore, we recommend a questionnaire elaboration model that meets compatible and adaptable assumptions to the environmental and organizational circumstances of different types of research. We also consider psychometric aspects in order to enhance data captures with higher empirical quality. Table 1 summarizes central procedures in questionnaire development.

**Table 1** Questionnaire Development Process

Procedure	Phase	Method	Stage	Product	Step
Theoretical	Theory	Research Project Design	Systematization	Subject of Study	1
		Literature Review	Properties	Attributes to be Assessed	2
			Model	Factors (dimensions)	3
		Literature Review	Literature Review	Questionnaire Structure	4
Experimental	Questionnaire Development	Categorization	Operationalization	Items	5
		Content and Semantic Analysis	Analysis of Items	Pilot Survey (pretest)	6
		Sampling	Data Collection Planning	Sampling Parameters	7
Analytical	Questionnaire Validation	Field Research	Questionnaire Application	Data	8
		Factor Analysis	Dimensionality	Factors	9
	Empirical Analysis	Analysis of Items	Difficulty / Discrimination	10	
	Internal Consistency	Questionnaire Accuracy	Reliability Coefficient	11	
	Standardization	Criteria	Development of Norms	Scoring and Interpretation	12

**Source:** Adapted from Pasquali (2017), Malhotra (2011) and Hair *et al.* (2014).



Initially, the theoretical procedures address the theory conception that underlies the questionnaire and specifies what will be measured and what is intended to be measured. Besides, the operationalization of these elements is approached on items or questions, based on aspects of semantic adjustment, relevance, and intelligibility. In addition, it should be analyzed by experts in the area (questionnaire theme) under investigation. As for the experimental procedures, the stages of sample definition, data collection, and questionnaire application are performed. In turn, the analytical procedures are related to the quality verification of the questionnaire, based on the analyses of validity and internal consistency, concluding in the elaboration of norms of scoring and interpretation (MALHOTRA, 2011; HAIR *et al.*, 2014; PASQUALI, 2017).

This article does not deal with all these issues but, it points out the appropriate paths and references so that the required skills for planning, developing, and adapting questionnaires as valid and reliable self-assessment tools can be achieved. As Shaughnessy, Zechmeister, and Zechmeister (2012, p. 174) indicate, “the accuracy and precision of questionnaires as survey instruments depend on the knowledge and care involved in their construction”.

## PLANNING QUESTIONNAIRES

If applicable to empirical research, the questionnaire should be planned before and during the research project design, avoiding changes after the start of data collection. Thus, it is worth mentioning that the research project – i.e., the study or investigation conception – is the initial stage to identify the necessary key-elements for the planning and development of a questionnaire. Such key-elements are intrinsically related to the researchers’ idea of the research itself.

Several handbooks of research methods have established a basic scope for the questionnaire development that shares a specific theoretical alignment (e.g., FOWLER Jr., 2011; MALHOTRA, 2011; BAPTISTA; CAMPOS, 2015; DRESCH; LACERDA; ANTUNES Jr., 2015; COOPER; SCHINDLER, 2016; GIL, 2019). Based on this scope, a questionnaire should be based on: (1) the research problem, (2) the research problem approach, (3) the research-type specifications, and (4) the analysis procedures – all information usually that are detailed in the research project design.

This scope imposes a difficult and unclear understanding of the relationship between the questionnaire and the research project design. The manuals are literatures that deal, in general, with the epistemology of the method, while the questionnaires are the usage of the methodology in the research practice, i.e., it is directly influenced by the researcher experience (see, LUKOSEVICIUS, 2018).

In an attempt to point out ways to clarify these methodological procedures and their practical meanings, the steps that provide the basis for planning a questionnaire are detailed respectively as follows:

**Based on the research problem:** the research problem defines the object that the investigation will focus on, i.e., what will be measured/identified. In terms of questionnaire planning, understanding the research object is the same as determining, for example, whether the investigated phenomena are related to (i) individuals or (ii) processes. That allows us to establish the items' contents with greater accuracy in the questionnaire. In addition, a questionnaire with different aims is more complex to be understood by respondents and to be analyzed by researchers. When multiple aims are necessary, it is suggested to develop more than one questionnaire in order to guarantee the validity and consistency of each instrument.

**Based on the research problem approach:** the research problem approach defines the results presentation format that will be expected. In terms of questionnaire planning, one should think about the end of the research process and how the data analysis will be presented (e.g., texts, diagrams, figures, graphs, charts, or tables). On the one hand, if the researcher determines that the results will be presented through tables or graphs (i.e., elements to describe numerical variables), we recommend using closed items, which are commonly used in quantitative research. On the other hand, if the researcher decides to present the results through text or diagrams, open items are more appropriate (more frequent in qualitative research).

**Based on the research-type specifications:** the research-type specifications define the methodological objective of the questionnaire (to explore, describe, or explain a phenomenon). Generally, exploratory researches are more flexible than descriptive and causal researches. Therefore, for exploratory re-

search, the elaboration of a new questionnaire seems more viable because the researchers can guide the research towards the thematic that they wish to deepen. In contrast, for descriptive and causal researches, specific analysis models are commonly used, which already have existing questionnaires with validity and reliability.

Nevertheless, if an investigation seeks to trace a cause and effect relationship (causal research), for example, between work motivation and productivity, a manager or consultant can use the Work Motivation Measure (QUEIROGA; BORGES-ANDRADE, 2015). However, they will need to develop their own questionnaire to measure work productivity in a specific context.

**Based on the analysis procedures:** The analysis procedures objectively define the types of data that the research intends to collect. Each type of analysis requires different types of data, which directly implies the format of the items. For example, for an interpretative analysis of content, speech, or semantics, which share particular analytical methods and require textual data, open-ended questions are recommended in order to encourage respondents to express themselves freely. In contrast, a mean comparison analysis between two contrasting groups (e.g., average production between employees who have undergone training and employees who have not) requires the items to generate non-categorical numerical data that allow the use of mean statistics.

After designing these aspects, the researcher should “pay attention to the cost, the time, and to the structure to ensure an acceptable response rate for the study” (FREITAS *et al.*, 2000, p. 107). Following this reasoning, Hair *et al.* (2014) ratify that the development of questionnaires is a logical and systematic process, which reflects the researchers’ decisions on how data should be extracted (collection) and treated (analysis).

## CONSTRUCT AND SCALING IN QUESTIONNAIRE DESIGN

As mentioned in the previous sections, questionnaires can assume different roles when conducting investigations. In surveys, for example, the questionnaire is characterized as the principal tool for analysing a phenomenon. Further, in re-

searches for the development of measuring instruments and scales, the questionnaire itself is the main object of investigation. In other cases, the questionnaire can be a support tool when focused on the sample description (e.g., sociodemographic questionnaires). Therefore, different research applications require different types of questionnaires. Those types are commonly defined based on two elements: construct and scaling.

Conceptually, a construct is the characterization or definition of an object, aspect, attribute, characteristic, or phenomenon, which is composed and can be structured directly or indirectly by indicator elements. These indicator elements are essential properties that, when associated, explain a given construct (HAIR *et al.*, 2014). For example, the quality of a product could be operationalized as a construct. Customer perceptions and the technical characteristics of this product are indicative elements that together represent a concept: the quality. When developing a questionnaire, the definition of the construct to be analyzed determines the indicator elements (variables) that will be measured. In practical terms, it means establishing the context and content of the items.

In turn, scaling is the metric and standardized delineation of descriptors that represent the chaining and ordering of response options to items (i.e., indicator elements) of a given construct (HAIR *et al.*, 2014). The descriptors determine the way the data will be extracted (collected), considering the most appropriate level of measurement for the type of scale: nominal, ordinal, interval, or ratio. Each level of measurement has requirements and content arrangement within a previously established structure. Proper scaling improves the possibilities of data analysis and increases the effectiveness of a questionnaire, especially regarding the reliability of the answers. According to Hair *et al.* (2014, p. 198), “whenever possible, it is preferable to use metric scales”.

In a hypothetical scenario where managers aim to know the opinion of their employees about daily organizational procedures (a construct), we may evaluate individual perceptions by applying different measures (scaling). Those measures would depend on the nature of data, the survey functionality, or the available analysis options. In Table 2, we detail the levels of measurement and the analytical possibilities for each type of scaling.

**Table 2** Levels of Measurement, Scaling and Analytical Possibilities

Levels of Measurement	Measurement Description	Type of Scale	Scale Specificities	Response Options	Scale Points	Examples of Analytical Possibilities
Nominal	The measurement variables represent labels or names with no numerical metric relationship, where the response options may imply mutual exclusion.	Simple Categorical Scale	Response options are or represent categories, whose choice of one option usually excludes the possibility of choosing another option (e.g., trainee or employee).	One or more	2	F, %, p, Mo, $\chi^2$ , C
		Dichotomous Scale	Two mutually exclusive dependent response options (e.g., Yes or No, Countryside or Urban Zone).	Two	2	F, %, p, Mo, $\chi^2$ , C
		Multiple-Choice	Response options represent a group of independent elements or categories (e.g., preference for: Marketing, Logistics, Finance, or Human Resources).	Three or more	2	F, %, p, Mo, $\chi^2$ , C
		Checklist	Response options comprise a list representing a category of elements (e.g., list of cities or professions).	Several	2	F, %, p, Mo, $\chi^2$ , C

	Ordinal	Paired Comparison Scale	Forced Rating Scale	Semantic Differential Scale	Multiple Rating List Scale	Comparative Scale
	The measurement variables are labels, names, or classifications with a numerical/value relationship that represent an ordering or increasing/decreasing direction, in which the choice of one implies dependence on the others.	Each response option evaluates the interest or disinterest regarding an item (product or brand), rather than another verified option, considering a predetermined criterion (e.g., higher efficiency): [1] Dell or Apple, [2] Dell or Acer, [3] Apple or Acer).	Response options have different meanings on an evaluation axis, in which the choices (they usually are phrases) can be mutually exclusive (e.g., What else has to do with you in the workplace: [1] High productivity or [2] Difficulty with interpersonal relations).	Response options are antonyms that are classified at the ends of a vertical or horizontal numerical scale, usually with 5 or 7 points (e.g., Available and Unavailable, Strong and Weak, Simple and Complex, or Professional and Amateur).	Response options indicate a ranking, considering the relationship between items (for products or brands) and a ranking scale (e.g., evaluation of different softwares according to [1] Efficiency, [2] Adequacy, [3] Performance, and [4] Applications).	Response options feature a conversion of metric values or scores within a numerical or graphical scale that evaluates items such as length, temperature, or speed (e.g., Kilometers per hour to Meters per second, Celsius to Fahrenheit, or Inch to Centimeter).
		Not applicable	Not applicable	One or more	Between two and ten	Between two and ten
		F, %, p, Mo, $\chi^2$ , C	F, %, p, Mo, $\chi^2$ , C	Parametric statistics: M, SD, r, t, F etc.	Nonparametric statistics: Md, rs, U, etc.	Nonparametric statistics: Md, rs, U, etc.
		5 to 7	5 to 7	5 to 7	5 to 7	5 to 7

<p>Ordinal</p> <p>The measurement variables are labels, names, or classifications with a numerical/value relationship that represent an ordering or increasing/decreasing direction, in which the choice of one implies dependence on the others.</p>	<p>Positive Scale</p> <p>Each response option is a forced-choice, which implies a different ordering for the item tested. Generally, it represents a preference or conclusive answer that considers at least three attributes. The response options can be based on the interindividual comparison, in which the scale requires interdependent scores and the total sum of the scores is always the same. For example, among the options (thinking, feeling, doing, and listening), determine how you best learn by the following ordering: (1) the least like me, (2) the third most like me, (3) the second most like me, (4) the most like me.</p>	<p>Three or more</p> <p>3 or 4</p> <p>F / Cronbach's Alpha / Anova / MDS</p>
<p>Interval</p> <p>The measurement variables are discrete numbers or whole numbers (metric values) that represent an interval (equidistant) that admits the sum and subtraction relationship between the variables.</p>	<p>Constant Sum Scale</p> <p>Response options receive numerical values that represent a preference score, in which the sum of all scores is usually fixed at 100 (e.g., distribution of 100 points for each e-mail domain according to its preference: Hotmail [35], Yahoo [25], Gmail [40]).</p>	<p>Several</p> <p>Not applicable</p> <p>Parametric statistics: M, SD, r, t, F etc.</p>
<p>Ratio</p> <p>The measurement variables are real numbers or metric values, representing a continuous point in which the value zero is absolute, i.e., it has no value, allowing arithmetic relationships between the variables.</p>	<p>Thurstone Scale</p> <p>Response options are indicated by the respondent within a scale of numerical intervals (e.g., from 1 to 9, assuming values like 2.7 or 7.6).</p>	<p>Several</p> <p>Not applicable</p> <p>Parametric statistics: M, SD, r, t, F etc.</p>

<p>Response options are metric numbers within a standard or predefined scale, in which the score measures specific elements such as height or length (e.g., meter or volume).</p>	<p>Response options are symbols or images representing metric numbers on a standardized or predefined scale, in which the score or punctuation indicates a measurement point, for example, within a geographic space (such as a ruler).</p>	<p>Response options are numbers usually operated within a horizontal or vertical scale from -3 to +3, without having a neutral point (i.e., without the value 0), which represents positive (upper) and negative (lower) degrees or levels of a label or adjective (e.g., Quality or Variety).</p>	<p>Response options are standardized according to a 5-point interval that classifies (in degrees) statements according to the response categories related to the object under analysis (e.g., 1. I totally disagree, 2. I disagree, 3. Indifferent or neutral, 4. I agree, and 5. I totally agree).</p>	<p>Response options are standardized according to continuous intervals (e.g., 1 to 3, 1 to 5, 1 to 7, 1 to 9, or 1 to 11 points), generally odd ranges, between statements that express two extremes (e.g., from “1 – it doesn’t describe me in absolute” to “7 – it describes me totally”).</p>
<p>Numerical Rating Scale</p>	<p>Graphic Rating Scale</p>	<p>Stapel Scale</p>	<p>Likert Scale</p>	<p>Likert-Type Scale</p>
<p>Parametric statistics: M, SD, r, t, F etc.</p>	<p>If numeric, Parametric statistics: M, SD, r, t, F etc.</p>	<p>Parametric statistics: M, SD, r, t, F etc.</p>	<p>Nonparametric statistics: M, SD, rs, U, etc.</p>	<p>Parametric statistics: M, SD, r, t, F etc.</p>
<p>3 to 10</p>	<p>Not applicable</p>	<p>10</p>	<p>5</p>	<p>3, 7, 9, or 11</p>
<p>One or more</p>	<p>One or more</p>	<p>One or more</p>	<p>One or more</p>	<p>One or more</p>
<p>Ordinal / Interval</p>				
<p>It uses the concepts of interval and ratio scales, but it assumes an evident logical and gradual ordering.</p>				

**Source:** Adapted from Malhotra (2011); Hair et al. (2014); Bermudes et al. (2016); Brown (2016); Cooper and Schindler (2016); Pasquali (2017); Hilton (2017); Gil (2019).  
**Notes:** F = frequency; % = percentage; p = proportion;  $\chi^2$  = Chi-square; C = contingency coefficient; M = mean; Md = median; Mo = mode; MDS = Multidimensional Scaling; SD = standard deviation; rs = Spearman’s correlation; U = Mann-Whitney test; r = Pearson’s correlation.



## FORMULATION OF ITEMS (QUESTIONS) IN A QUESTIONNAIRE

Besides, the formulation of the items of a questionnaire represents an operational step linked to the chosen scaling as a measurement and analysis technique. The literature warns that the items of a questionnaire should be planned considering their clarity, objectivity, and accuracy (e.g., MOREIRA, 2009; VIEIRA, 2009; GIL, 2019). Additionally, it is necessary to understand that the items are the nature of the questionnaire itself. Therefore, the questionnaire reflects the quality and extent of its items – its capability to collect data proficiently.

Aiming to establish minimum quality parameters for the items of a questionnaire, a compendium of 10 development and writing criteria is gathered in Table 3, which makes the questionnaire more robust.

**Table 3** Criteria for the Preparation and Writing of Items

Criteria	Requirement
Unicity	Each item must allow only one interpretation.
Objectivity	The item must be clear, precise and direct.
Simplicity	The item should express simple ideas, preferably one at a time.
Clarity	The item must be intelligible to the lowest stratum of the target population.
Relevance	The item must be consistent with the research and the proposed theoretical foundation.
Accuracy	The item must be precise and distinct from other items dealing with the same construct.
Variety	The items should vary in language, avoiding the use of the same terms.
Diligence	The items should avoid the use of extremist expressions.
Typicality	The items must use expressions and words that are related to the questionnaire theme.
Credibility	The item must be written in a way that it does not look ridiculous, unreasonable or childish.

**Source:** Adapted from Pasquali (2017) and Gil (2019).

In addition to these criteria, the scaling and scope of the research project imply in the formulation of the items - besides interfering in the overall questionnaire planning. For scaling, it is necessary to understand that an item (e.g., one that investigates customers' opinions about a brand) may contain different response possibilities (see Table 2). Also, depending on the item format and its respective scaling (e.g., dichotomous, multiple-choice, or Likert scale), both analytical possibilities and data interpretation are modified.

Regarding the scope of the research project, it is suggested that the writing of the items follows the research method manuals (presented in the Questionnaire Planning section). Initially, the elements of investigation should be determined based on the research problem. For example, when the research focuses on people, it is possible to analyze individual characteristics (e.g., values or attitudes) or opinions (e.g., beliefs, satisfaction, or preferences). In contrast, when the investigation focuses on processes, it is possible to analyze the effectiveness or efficiency of a system, program, or procedure. The items should be adjusted in order to allow this measurement by considering the research content. Later, this will ensure that the data analysis will adhere to the research approach.

On the one hand, if the investigation elements (people or processes) are expressed numerically (e.g., size, extent, volume, or quantity) to meet the requirements of the research approach, a structured (closed) item should be prepared. For example, "*I am dissatisfied ... 1 .. 2 .. 3 .. 4 .. 5 .. 6 .. 7 ... satisfied with the service provided by this company*" (structured item on a Likert-type scale related to individuals) or "*improvement in time in the execution of activities through the new computerized system (insignificant = 1 / small = 2 / moderate = 3 / considerable = 4 / substantial = 5)*" (structured item on a Likert scale related to processes).

On the other hand, if the investigation elements (people or processes) are expressed textually through qualitative attributes (e.g., subjectivities, sensations, reactions and particular judgments), an unstructured (open) item should be elaborated. For example, "*how do you feel about the service provided by this company?*" (unstructured item related to people) or "*explain how the new computerized system has or has not improved the performance of activities:*" (unstructured item related to processes).

From the initial scope of the structure of the items, we should determine how the data will be analyzed, based on the research type. For structured items, the

quantitative bias predominates, which covers descriptive (e.g., frequency, mean, standard deviation), exploratory (e.g., correlation, factor analysis, multidimensional scaling), or confirmatory statistical analyses (e.g., linear regression, structural equations modeling). For unstructured items, the qualitative bias predominates, which covers procedures for interpreting observations or narratives from a specific point of view or perspective (ABDALLA *et al.*, 2018). For example, content analysis (BARDIN, 2011) or computerized content analysis through Iramuteq (SOUZA *et al.*, 2018).

Finally, after defining the structure of the items, the chosen analysis procedures should guide the types of data. This procedure may be related to the research purpose. Specifically, in a comparative quantitative research, the comparison of means is a viable procedure, whose type of analysis depends on the criterion variable. When the comparison criterion is a dichotomous variable (e.g., participation in a training program: [1] yes or [2] no), it is recommended to use the Student t-test or the Mann-Whitney U test – the latter for small samples or samples that have not a normal distribution. When the comparison criterion is a categorical variable with more than three options (e.g., schooling: [1] elementary school, [2] high school, [3] higher education, and [4] postgraduate), the analysis of variance (ANOVA) is recommended (HAIR *et al.*, 2018).

As shown in Table 2, the required type of data is what should determine the structure of the items. Consequently, questionnaire development may comprise a lengthy and complex activity. Besides the above-mentioned procedures for planning questionnaires, a research instrument requires validity and precision, which depend on the type of items, the scaling model, and the extent of analytical possibilities.

#### Validity and Precision of the Questionnaire

Questionnaires need to be valid and precise to achieve robust results (SHAUGHNESSY; ZECHMEISTER; ZECHMEISTER, 2012). The validity should be interpreted as the evaluative adequacy of the questionnaire to what it was proposed to measure, determining how the items represent valid estimates and sound inferences about a phenomenon. Predominantly, the validity of a questionnaire is estimated employing the factor analysis or the convergent-discriminating technique. For instance, the factor analysis identifies the items that retain the greatest power of explanation and suggests the withdrawal of those that do not present an explanatory contribution. The convergent-discriminating technique uses a hypothesis test to

identify if what was predetermined for the items in the planning phase is occurring empirically in the testing phase (HAIR *et al.*, 2014; PASQUALI, 2017; GIL, 2019; ALBUQUERQUE *et al.* 2019).

In turn, the precision should be interpreted as the reliability – also known as internal consistency or accuracy – of the questionnaire, representing the capability to measure an attribute consistently and considering the minimum of error (HAIR *et al.*, 2014; PASQUALI, 2017; GIL, 2019). In most cases, the reliability of a questionnaire is estimated by employing Cronbach's alpha coefficient. It evaluates the internal consistency of the questionnaire, verifying if the items that represent the same dimension of a phenomenon are answered according to considerable degrees of correlation, i.e., the congruence of an item with the other items of the questionnaire (PASQUALI, 2017).

For example, Souza *et al.* (2016) developed the Inventory of Barriers and Facilitators to Entrepreneurship (IBFE) – a questionnaire that maps the factors that can inhibit or induce an individual to undertake a business, a project, or an idea – and presented psychometric evidence of validity and internal consistency. For the first validity procedure, the authors used factor analysis. Factor analysis identifies the number of constructs (factors or concepts) required to explain the intercorrelations and covariances between the items (the factor loadings). It empirically represents what the items retain in common.

After the factor validity procedures, the authors presented an excessively large questionnaire with 81 items. In order to provide a questionnaire with a more parsimonious and accurate set of items, the authors choose the 40 items with the best explanation power (i.e., items with the highest factor loadings). Additionally, Souza *et al.* (2016) estimated the reliability of the IBFE through Cronbach's alpha – a measure that varies from 0.0 to 1.0, being the value of 0.600 considered the lower limit of acceptability (HAIR *et al.*, 2018). Therefore, the IBFE demonstrated factor validity and internal consistency.

Next, to assess criterion validity, the authors assumed the hypothesis that entrepreneurs presented more facilitators to entrepreneurship than university students. The means of entrepreneurs ( $n = 57$ ) were compared to the means of university students ( $n = 194$ ) through the Student t-test. The results confirmed the hypothesis and indicated the questionnaire's precision (SOUZA *et al.*, 2016).

However, obtaining a valid and precise questionnaire involves theoretical knowledge, analytical skills, experience with data collection procedures, and advanced statistical analysis skills (HAIR *et al.*, 2018; PASQUALI, 2017). Because of this, Field and Hole (2002) emphasize that the essential golden rule, for any type of research, is to avoid developing the own questionnaire and invest in ready-to-use instruments, in which adequate validity and reliability parameters have already been checked.

## **READY-TO-USE QUESTIONNAIRES (RESEARCH INSTRUMENTS)**

When conducting a research project, developing a questionnaire and, consequently, utilizing it is a challenging task. Usually, the development of a questionnaire is the research project itself, given the involved level of complexity, the required enormous time, and the lack of guarantee that, in the end, the developed questionnaire will be useful for the researcher.

Well-designed, theoretically grounded, and highly functional questionnaires require years to develop and confirm their validity. To be properly calibrated and obtain its standardization, a questionnaire may take decades to be completed like the Learning Styles Inventory (KOLB; KOLB, 2013) or the Big-Five Inventory, a multidimensional personality scale (LAROS *et al.*, 2018).

The calibration of a questionnaire may depend on the technique adopted. In the Item Response Theory (IRT), for example, an item presentation order depends on its degrees of difficulty or influence on the response flow. This strategy aims to identify which items are the most effective in a measurement process (HASSAN; MILLER, 2019). For instance, the IRT has been widely employed in the preparation and evaluation of the Brazilian National High School Exam (ENEM, in Portuguese, *Exame Nacional do Ensino Médio*) (PASQUALI, 2017).

As a result, some authors (e.g., FIELD; HOLE, 2002; PASQUALI, 2017) advocate the use of existing instruments (with assessed validity and reliability parameters) in research projects, whose technical and theoretical quality has been empirically tested to determine a more precise data accuracy and gain methodological robustness.

Most useful questionnaires for research in business administration are found in scientific-academic journals, dissertations/theses, and books. For example, the

Inventory of Barriers and Facilitators to Entrepreneurship, mentioned in the previous section, was presented in the Electronic Journal of Administration (REAd, in Portuguese, *Revista Eletrônica de Administração*) (SOUZA *et al.*, 2016), while the Big-Five Inventory was adapted to the Brazilian context and presented in the Journal of Psychology: Reflection and Criticism (In Portuguese, *Revista Psicologia: Reflexão e Crítica*) (LAROS *et al.*, 2018).

Table 4 shows examples of books and websites that provide questionnaires and research instruments with validity and reliability. Those questionnaires are ready-to-use for researching in business administration, and they provide precision, adjustment, and standardization.

**Table 4** Examples of Books and Websites with Questionnaires for Business Administration and Marketing Research

Site	Example	Usage Cost
Books	Book Title: Medidas do comportamento organizacional. Authors: M. M. M. Siqueira (Org.). Publisher: Artmed. Publication Date: 2008.	Free
	Book Title: Medidas de avaliação em treinamento, desenvolvimento e educação. Authors: G. S. Abbad <i>et al.</i> (Orgs.). Publisher: Artmed. Publication Date: 2012.	Free
	Book Title: Novas medidas do comportamento organizacional. Authors: M. M. M. Siqueira (Org.). Publisher: Artmed. Publication Date: 2014.	Free
	Book Title: Ferramentas de diagnóstico para organizações e trabalho. Authors: K. Puente-Palacios & A. de L. A. Peixoto (Orgs.). Publisher: Artmed. Publication Date: 2015.	Free

Websites	Organization: Pearson Clinical	
	Access Link: <a href="http://www.pearsonclinical.com.br/produtos/testes-nao-restritos.html">http://www.pearsonclinical.com.br/produtos/testes-nao-restritos.html</a>	Paid
	Organization: MindGarden	
	Access Link: <a href="http://www.mindgarden.com">http://www.mindgarden.com</a>	Paid
	Organization: Survio	
	Access Link: <a href="https://www.survio.com/br/modelos-de-pesquisa">https://www.survio.com/br/modelos-de-pesquisa</a>	Paid
Organization: Psychological Assessment Resources, Inc.		
Access Link: <a href="https://www.parinc.com">https://www.parinc.com</a>	Paid	
Organization: Avalio		
Access Link: <a href="http://avalio.com.br/modelos-de-pesquisa-e-questionario">http://avalio.com.br/modelos-de-pesquisa-e-questionario</a>	Free	

Source: Authors.

## QUESTIONNAIRE STRUCTURE PLANNING

In the absence of ready-to-use questionnaire options, researchers may need to develop their own questionnaire with specific items and content to the research demands. Most research methods manuals are consensual on the need for an exhaustive literature review on all the theoretical and empirical elements associated with the questionnaire theme.

As mentioned previously, research manuals guide the questionnaire development according to the research project fundamentals, which precede the questionnaire development and justify its elaboration. In particular, those manuals establish that the development of a questionnaire should be a rigorous and detailed process. This process comprises the production and revision of items (either in content or semantics), scaling, and application structure, aiming at establishing advanced data collection practices.

Therefore, the checklist below explains elementary procedures for the development of a questionnaire based on the guidelines proposed by Malhotra (2011), Hair et al. (2014), Pasquali (2017), and Calleja et al. (2019).

1. Before developing a questionnaire, a thorough reading of books, articles, and other materials related to the subject of the questionnaire should be done (see the literature review section).
2. After that, the information and data to be collected should be listed, considering the alignment with the central objective of the research.
3. Afterwards, one should determine the requirements for the data collection procedures by considering appropriate options based on the following aspects: (a) item format, (b) type of scaling, (c) analytical possibilities, (d) target audience, (e) limitations, (f) contextual moment of the survey, and (g) estimated time for complete the responses.
4. The items should be written according to the criteria indicated in Table 1.
5. The questionnaire should follow a logical order, according to the following sequence: (a) qualification or screening items, (b) introductory items, (c) main items, (d) psychographic items, (e) demographic items, and (f) complementary identification items.
6. One should verify the specific content of each item, checking the written and the soundest structure of the questionnaire.
7. The questionnaire should follow a thematic sequence or sections, for example: (a) satisfaction items, (b) attitudinal items, (c) sociodemographic items, etc.
8. Before each item section, the instructions for answering the questionnaire should be clearly expressed.
9. Items of different measurement or scaling formats should be avoided in the same section.
10. Brief questionnaires should be started with the easiest items, gradually moving towards the most difficult items. Long questionnaires should start with the most difficult items, gradually moving towards the easiest items.
11. At the end of the questionnaire, it is suggested to thank the respondents.
12. Once the questionnaire is ready, an introductory section should be written to include a general description of the study.
13. After the introductory section, the questionnaire should present an informed consent form, and the researchers should be aware of ethical is-



sues. For instance, all academic research with human beings should be approved by a research ethics committee.

14. Finally, the format and layout of the questionnaire should be determined for a pretest phase.

## Illustration of a Hypothetical Case

In order to demonstrate the practical aspects of planning and developing questionnaires, an illustration of a hypothetical case in a managerial context is presented below.

This hypothetical context comprises a medium-sized retail company (clothing business) subdivided into the administrative sector (e.g., salary payment and materials management), the financial sector (e.g., financial transaction flow and accounting), and the commercial sector (e.g., customer registration, sales prospecting, and after-sales). Also consider that this company needs to implement a management information system (MIS).

Sectorial managers observed problems such as: (i) operational failures, (ii) reports with inaccurate information, (iii) supplier invoices with incorrect payment, (iv) difficulty in product exchange, among others. Therefore, the use of an integrated MIS was proposed. After its conception, the integrated MIS had the following modules: Cash, Stock, Administrative-Financial, Clients, and Marketing.

Afterwards, sectorial managers decided to conduct a survey on the employees' perception and satisfaction about the functionality of the deployed system. The first proposition included the development of a questionnaire. However, the managers had several doubts about the survey conduction through a questionnaire, such as: What kind of questionnaire should be used? How should the items be structured and written? What are the analytical possibilities? How to compare the employees' perceptions from different sectors? What types of data meet the requirements of this analysis?

Initially, the managers looked for existing questionnaires in the literature that had already been validated, and that met the survey purpose [e.g., the Sun and Teng (2017) questionnaire, which measures the perceived impact of information technol-

ogy in daily work]. Since the managers wanted to focus on perceptions mapping about the implemented system, and the questionnaire should be related to user satisfaction, the first questionnaire was unsuitable for the research proposal. Then, the managers looked for a questionnaire closer to the desired context and found the instrument of Harrati *et al.* (2016), which is about end-user satisfaction regarding computational tools.

Nevertheless, the questionnaire did not meet all the research requirements. When the objective is to map or evaluate the impact of specific actions on individuals, a team, or an organization – as in this illustrative case – with direct reflexes on the production line, it is likely that the development of a specific questionnaire will also be necessary.

Therefore, the managers decided to develop a new questionnaire by following the steps from the research methods manuals and considering the notes from the Questionnaire Planning section in this article. Before starting the development of the questionnaire, the managers responded to four basic questions: (1) What will be investigated? (2) What will the type of questionnaire be like? (3) How will the data be analyzed? (4) What type of data will be collected? The managers answered these questions as follows: (1) people; (2) structured (closed) questionnaire by a quantitative approach; (3) statistic of mean to perform tests of correlation and comparison of means; (4) ordinal/interval data.

Based on those answers, they obtained a more explicit direction to start the questionnaire developing process. In conclusion, the managers created specific items for the investigation by following the instructions in Table 1, and proceeded to the operational phases of diagramming, designing, validating, and testing the questionnaire.

## Final Remarks

This article aimed to deepen the planning and operationalization of questionnaires as research tools, considering theoretical and practical perspectives. In this manner, it intertwines the knowledge in psychometry (scaling, measurement theory, validity, and reliability) with marketing research (surveys and projects con-

duction), and focuses on best practices in empirical research through the use of questionnaires.

The use of validated and standardized ready-to-use questionnaires is highlighted and defended in this article, as they provide an effective means for measurements with quality and effectiveness, translating into more reliable data and more accurate results. Nevertheless, given the necessity of developing a questionnaire, we recommended reflecting on the research or investigation to be undertaken. Planning questionnaires should start from the definition of the measure and the scaling. A valid and precise questionnaire meets data requirements and research objectives. Also, the data collection without adequate theoretical and experimental treatment leads to measurement errors and high bias rates (beyond those already existing in any investigation through self-reported questionnaires).

As a limitation, this study does not address all elements for the development of questionnaires since only one article does not account for all textual and graphic elements available. For example, we do not deepen validity and reliability aspects because there is a vast literature that deals with related psychometric and statistical details (e.g., HAIR *et al.*, 2018; PASQUALI, 2017; CALLEJA *et al.*, 2019). Also, we do not deepen the data collection steps since specific literature in marketing research develops this topic proficiently (e.g., MALHOTRA, 2011; HAIR *et al.*, 2014; MALHOTRA, 2018). Besides, this study does not bring contributions to the adaptation of already validated and ready-to-use questionnaires in a specific research context. This adaptation process may involve translation, terminology changes, and other operational modifications that require particular procedures, as if developing a new instrument. For details on questionnaire adaptation, see Phongphanngam and Lach (2019).

Ultimately, for more considerable proficiency in planning, development, validation, and standardization of questionnaires, the experience of the researcher in this activity is essential, including knowledge in data processing and analysis (quantitative or qualitative), and the expanded use of quality research instruments already validated.

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