

# Qualitative and quantitative methods in health: definitions, differences and research subjects

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## Keywords

Biomedical research, methods. Qualitative research. Research personnel.

## Abstract

The interest and accomplishments in qualitative research have been increasing in health. As a consequence, there is a greater demand for both institutional research programs and scientific journal publications. This article has the following purposes: (a) to present some definitions in qualitative methods used in Humanities and Health; (b) to compare them to the usual quantitative methods of health sciences; and, finally, (c) to illustrate the subject with the most important constructs in these methodological fields. Above all, the author's scope was to provide criteria to evaluate the pertinence of the path taken by qualitative researchers, from research plan elaboration to result interpretation.

## INTRODUCTION

There have been increasing interest and accomplishments in qualitative research in the health field. There is thus greater demand by researchers for institutional research programs as well as academic meetings and scientific journals in order to carry out projects and disseminate their work results. In the last decade, qualitative research has become well accepted by medical journals. But, in earlier times, qualitative research manuscripts had been rejected for being considered nonscientific, as if they consisted of merely curious personal accounts of one's life events without systematic concerns, i.e., they were deemed anecdotal.<sup>2</sup>

Fortunately nowadays many scientific journals generally publish qualitative research studies. For example, the Journal of Public Health (*Revista de Saúde Pública*), a renowned periodical, has even guidelines for evaluating qualitative papers by its referees. It is now common to find health professionals who not only give importance to qualitative methods in medicine but also recognize their help for better understanding patients' life. An increasing number of medi-

cal researchers have been using these methods in their work.<sup>2</sup> However, it does not necessarily mean that qualitative methods are well understood and properly used as, among other problems, some investigators present qualitative study reports with common sense conclusions.

Facing these challenges, there was a need for a tutorial article discussing qualitative research methodology, bringing to the readers its most relevant definitions. In addition, such definitions would need to be compared with both classic concepts of conventional field research, such as epidemiological research, and other procedures of scientific surveys generally constructed with measurements and other mathematical tools. And finally, the academic audience could discriminate better the themes and constructs which are currently most explored in these methodological fields.

The specific objective of this paper is to provide input for exercising good judgment and further exploring the issue of qualitative methods with a well-delimited object to be employed in understanding the health-illness setting/process. Readers and con-

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sumers of these scientific outputs are here targeted to allow them to have a greater *clarity of criteria* to critically evaluate the pertinence of the path taken by qualitative researchers, from research plan elaboration and data collection to result interpretation. Similarly, this article purpose is to provide information to those academics who intend to develop qualitative research projects, to allow them to apply the same accuracy as expected for any generating knowledge in science. Hence, it is presented the concerning definitions and a comparative discussion between *qualitative* and *quantitative* methods and, by the end, a diversified list of conceptual constructions specific to each method vocabulary.

## HISTORICAL BACKGROUND

The discourses of Natural Sciences – Physics, Chemistry, Biology and their numerous related sciences, among them Medical Sciences – are associated with the understanding of quantitative or explanatory methods. In the same way, the discussion on Human and Culture Sciences is combined with that on qualitative or understanding methods. Modern scientific thought, as it is known, has started almost four centuries ago with Galileo. It is his legacy of giving autonomy to Science, distinguishing it from both Philosophy and Religion, so delimiting which will be its object, objective and method (observation, experimentation and induction).<sup>8</sup> Science has been established since then on the specific object of nature beings, i.e., on the study of the laws that enunciate the links of natural phenomena among themselves, while Philosophy should be concerned with ontological issues (the being as such) and, at last, Religion would preserve, as its object, the so-called religious truths.

Qualitative or understanding methods have a more recent history. They are about a century old and have started at the time of the first ideas of giving autonomy to Human Sciences, arising in counterpoint to the already existing Natural Sciences. From its qualitative methods, the discipline of Anthropology has developed the so-called ethnography, which has been revolutionized in 1920s with Malinowski's publications.<sup>10</sup> The anthropologist Malinowski has spent years living among Oceania's natives, participantly observing their lives. From that, Science's history has attributed him the pioneerism in the qualitative scientific methodology, as he systematically described how he had obtained his data and his field experience.

However, credit should be given first to Marx and Freud for having offered important epistemological cuts for new and thorough understanding of the hu-

man being, which has initiated autonomous scientific studies in human sciences. These thinkers have built up schools of thought, unveiling the mechanisms of the acting Ideology in social groups and unmasking the mechanisms of the acting Unconscious in individuals' life.<sup>4</sup> They have significantly contributed to support the scientificity of Human Sciences, where lies the locus of methodological construction of qualitative research.

## COMMON CONCEPTS OF QUALITATIVE METHODS

From a methodological perspective, if one wants to scientifically explain, for instance, the phenomena related to drug addiction, this is a subject for researchers in psychiatry, epidemiology or clinical pharmacology. But if one wants to understand what substance dependence means in the life of an addicted patient, then it is a subject for qualitative researchers, who can be psychologists, psychoanalysts, sociologists, anthropologists or educators. However, it would be very interesting if health professionals could actually employ qualitative methods. They have the advantage of, due to their clinical practice, having inherent clinical and existential attitude,<sup>14</sup> which will allow them to perform rich data collections and to make authoritative result interpretations.

On the other hand, it is crucial to bear in mind a clear concept of research qualitative method to avoid purely reproducing the understanding accrued from other approaches and assertions such as research methods where tools like numbers, percentage calculations, statistical techniques, tables, statistically representative samples, random essays, closed questionnaires or evaluation scales are not employed. To define a concept by denying it does not evidently constitute a definition.<sup>14</sup> It is also not the case of saying, as often is intuitively assumed, that qualitative methods are for studying the "quality" of an object. Qualitative methods applied to health employ the concepts borrowed from human sciences, according to which the study focus is not the "thing" itself, but to understand its individual or collective meaning in people's life. It is indispensable to know what the phenomena of both and life generally mean to them, because the *meaning* has a *structuring function*: people will organize their lives around what things mean to them, including their healthcare.

It should not, however, be confounded qualitative research in both Health and Human Sciences and the usual research in Nature Sciences. There, qualitative studies are conducted to know the physical, chemical and biological "qualities" of the investi-

gation object. Nature Sciences researchers often refer to the application of *qualitative methods* while conducting studies, for example, in biology areas, specifically in medical parasitology, with the objective of detecting the presence of protozoans in collected material for clinical testing. It is used the term *qualitative*, evidently with a specific meaning within its epistemological-methodological model. For that, the researcher will employ techniques such as sample collection according to well-defined procedures; storage in adequate containers, careful sample identification and sample analysis in a well-equipped laboratory. In short, the researcher will study in-depth a particular natural phenomenon and describe its properties, carrying out a *qualitative research in Natural Sciences*.

Back to the Human and Health Sciences context, it is first presented here a generic definition of qualitative methods by the sociologists Denzin & Lincoln,<sup>6</sup> usually quoted in the literature: “Qualitative researchers study things in their natural setting, attempting to make sense of, or interpret, phenomena in terms of the meanings people bring to them”. Reading only this definition cannot be enough for an accurate understanding by readers not familiarized with this research approach. It is again underlined that researchers’ are not directly interested in studying the phenomenon itself, but their actual target is the *meaning* the phenomenon have for those experiencing it.

Similarly, the educators Bogdan & Biklen<sup>1</sup> point out that “qualitative researchers’ goal is to better understand human behavior and experience. They seek to grasp the processes by which people construct meanings and to describe what those meanings are”. These authors also assume *meaning* as the key concept. It is inferred that qualitative researchers does not want to explain events in peoples’ life, individually or collectively, by listing and measuring their behaviors or quantitatively correlating their life events. Conversely, their intention is to gain an in-depth knowledge of people’s life experiences and their representations of these experiences.

In their attempt to provide a detailed definition on qualitative methods, the nurses Morse & Field<sup>12</sup> characterize them as “inductive, holistic, emic, subjective, and process-oriented research methods used to understand, interpret, describe, and develop theory pertaining to a phenomenon or a setting”. Although these authors aimed at a comprehensive definition, they left out the terms *meaning/signification*. In its broad scope, however, the word *theory* gains strength, which implies that qualitative method is not only a research approach that meets

specific demands, but it has the common purpose of creating a model for in-depth understanding of the links among elements, i.e., of exploring an order that is invisible in the ordinary examination. It is also underlined the term *process*, particularly powerful here, which characterizes the qualitative method as designed to understand how the study object happens or develops; and not to aim at the *product*, that is, mathematically estimated results. The *inductive* reasoning relates to the fact that these researchers would ground their work on field data, further exploring individualities and collecting information that would gradually help to build up a plausible and dense *theory*. Emic means that scientists’ interpretations should be made from the interviewees’ perspective and should not be a discussion from the researcher’s or the literature’s view. Original knowledge should be gained and they should not focus on corroborating the already existing theories as this does not contribute to science advancement.

Favoring a *structural definition* from a sociological perspective, Minayo<sup>11</sup> identify qualitative research methodologies as “[...] those capable of incorporating both the meaning and intentionality as inherent to acts, relationships and social structures, the latter considered to be both on their advent and their transformation as significative human constructions”. The term *meaning* gains relevance in the social context in trying to understand the “want to say” regarding to these structures for the study subjects.

Finally, it is presented here the *clinical-qualitative methodology* definition, a particularization and refinement of the generic qualitative methodologies from Human Sciences, but addressed specifically to the life experience in health settings: “It is the theoretical study – and its corresponding use in investigation – of a set of scientific methods, techniques and procedures, adequate to both describe and interpret the senses and the meanings given to the phenomena and also related to individuals’ life (patients or any other participating person in the healthcare setting, such as family members, health professionals and community people).<sup>13</sup> In this particular approach, researchers use an eclectic theoretical reference framework for both project writing and result discussion from a interdisciplinary view. The whole scientific undertaking must be supported by three pillars, which work as delimiting characteristics and consist of the following attitudes: existentialist, clinic and psychoanalytic. They provide, respectively, a welcome attitude to human being’s inherent angst and anxieties; a proper approach of those who already work with therapeutic aid; and

**Table 1** - Differences and similarities between quantitative and qualitative research methods.

Conceptual levels in methodologies	Experimental and field quantitative methods	Field qualitative methods
More influent paradigm	Positivism	Phenomenology
Scientific attitude	Search for the explanation of behaviors of things	Search for the understanding of the human being's dynamics
Reasoning of the method	Epistemologically, all methods are deductive a priori (departing from hypotheses formulated by researchers from their life experiences and theoretical studies) and inductive a posteriori (departing from collected data in the field, laboratory or literature)	
Strength of the method	Attributed to the quality of high reliability/reproducibility of the results	Attributed to the quality of high validity of the collected data/findings
Study object	Facts (viewed and described)	Phenomena (grasped)
Research objectives	Mathematical establishment of the cause-effect relations	Interpretation of phenomena meaning relations as reported by people
Philosophy and science reference authors	Descartes, Comte, Claude Bernard, Pavlov, Durkheim	Dilthey, Marx, Freud, Malinowski, Weber
Theoretical reference framework	As in any research, it joins knowledge, schools of thought and authors which give support to both researcher's scientific thought and their professional practice	
Common subjects	More frequent, general and universal occurrences	Specific occurrences and in particular settings
Main disciplines	Medical Sciences, Behavioral Psychology, Positivist Sociology	Psychoanalysis, Anthropology, Understanding Psychology, Understanding Sociology
Interest for comparisons	Occurrences compared between exposed and non-exposed groups to certain variables, phenomena or situations	Search for intergroup comparisons is useless
Project design	Pre-established resources	Open and flexible resources
Project course	Predetermined procedures	Adjustable procedures
Specific instruments	Surveys and experiments	Researcher-as-instrument
Types of research instruments	Directed observation, closed questionnaires, scales, nosological classifications, laboratory tests, randomized data of patient's records, psychodiagnosis	Researcher and their senses: free observation, semidirected interviews; complementary instruments: intentional collection from patient's records, projective psychological tests
Instrument adequacy	Pilot essay	Acculturation essay
Sampling	Randomized: group of individuals taken by chance, statistically representative of a large population	Intentioned: purposive search for individuals experiencing the focused problem and/or have knowledge about it
Sample profile	Greater number of subjects; participants with characteristics of the whole population	Few subjects; participants with characteristics of certain subpopulation
Sample size	Previously and statistically defined; "N" is required	Concern with a "N" is impertinent; number of subjects defined in the field
Study of variables	Need for controlling variables	Non-control of variables; they need to be free
Data treatment/ analysis	Application of biostatistical techniques to organize findings; usually tabulated by experts	Application of content analysis (among others): categorization by theoretical relevance or data reiteration; performed by the researcher
Presentation of results	In mathematical language (tables, pictures); usually apart from the discussion in the scientific report	Use of field observations and quotations; integrated to the discussion section
Target of the result discussion	Establishment of correlations among (mathematical) results	Interpretation of categorized data, simultaneously to their presentation
Discussion strategy	As in any knowledge area and with any scientific method, the discussion/interpretation proposes the existence of a non-visible relationship among the obtained elements (the theory)	
Comparison in the literature	Confrontation of findings with results from other quantitative researches	Confrontation of new concepts with those constructed in other qualitative research
Finalization of the theoretical conception	Initial theoretical construction is verified and tested	Initial theoretical construction is, at least, reinitiated, reformulated, deflected and clarified
Conclusions on the hypotheses	Confirmation or refutation of previously defined hypotheses	Initial and later hypotheses reviewed in a crescendo; constructed concepts
Type of generalization (made/ proposed/ assumed)	Statistical: from (mathematical) results applied to explain other populations with same variables.	Conceptual: from new knowledge and reviewed proposes applied to understand other people or settings with same life experiences.
Generalization by whom	Established/given by the author/ researcher.	Verified/validated by research reader/ consumer

the listening and the valuing of mobilized psychodynamic aspects, overall in their affective and direct relationship with the study subjects. This method has proved to be adequate for qualitative research already carried out in the health area.<sup>3,5,7</sup>

## CHARACTERISTICS OF QUALITATIVE METHODS<sup>1</sup>

First, the researcher's interest turns toward the search for the *meaning* of things because it has an *organizing role* in human beings. What "things" (phenomena, manifestations, occurrences, facts, events, life experiences, ideas, feelings, subjects) represent shape people's lives. At another level, the meanings "things" acquire are culturally shared and so organize the social group around these representations and symbolisms. In health settings in particular, knowing the *meanings* of phenomena of the health-disease process is essential for the following: to improve the quality of professional-patient relationship; to promote better adherence of patients and general population to individually administered treatments and collectively implemented preventive measures; to better understand certain feelings, ideas and behaviors of patients as well as their family members and even health professionals.

Second, in this approach, the subjects' *natural setting* is unequivocally the field, where observation, without variable control, takes place. Third, researchers are themselves a *research instrument* as they use their sensory organs to grasp the study objects, mirroring them in their consciousness, where they then are converted into phenomenological representations to be interpreted. Fourth, this method has greater data *validity* strength since the thorough accurate observation and in-depth interview listening of subjects are likely to lead researchers very close to the essence of the study issue. Fifth, since *generalization* does not derive from (mathematically) estimated results because it is not based on either the quantification of occurrences or the establishment of cause/effect relationships; it becomes possible from the review of initial hypotheses, i.e., the constructed concepts and the original knowledge produced. It is up to research readers/consumers to use them to examine their plausibility and utility in or-

der to understand new cases and *settings*.

For instructive purposes, it is now relevant to draw the comparative profiles between the characteristics of both *qualitative* and *quantitative* methodologies applied to health. Table 1 illustrates the *conceptual levels* of both methodologies. First it shows the scientific attitude one should adopt when using either one of these methods. It can also be seen the strengths (*reliability* versus *validity*) as well as the actual *limits of the subject* under study in each approach; and then the dissimilarities in the different study designs and research instruments are identified. The critical point is to show the differences in *sampling technique* and *subject sample profile*. *Data analysis* shows distinctive refining of collected data in both methods. Finally, it should be made clear what in fact the *conclusions* are in each method and the resulting work of disentangling the knots concerning the intended and the possible *generalization* from both quantitative and qualitative research.

This important chart displaying their *dissimilarities* reveal that each method has its own identity from the moment the authors formulate the questions (the working hypotheses) up to the writing of their research final reports. The complexity of each scientific undertaking and, most of all, the autonomous epistemological constructions, which give them support, disavow most research studies self-entitled "*quanti-quali*" to continue to be carried out in the academic environment using this supposedly mixed model. In fact, many such research studies are conceived only on quantitative constructions, since simply embedding subjects' quotations, collected using previously standardized questionnaires, does not acceptably configure a claimed simultaneity of qualitative research.

In conclusion, Tables 2 and 3 aim at codifying the most common used constructs in *qualitative* and *quantitative* research, respectively. In the right column, showing how each concept is constituted, well-established definitions from epidemiology literature<sup>9</sup> and/or well typified health sciences descriptors<sup>15</sup> are presented. It is hoped that a broad and comparative appreciation of the two frames would allow readers to distinguish the investigation health fields for each method

**Table 2 - Currently valued subjects in qualitative research in health areas.**

Usual constructs in qualitative methods	How they are established
Meanings/ significances/ resignificances	In health settings, usual or new phenomena: have a want-to-say, start to represent or symbolize something (psychologically or sociologically) for certain individuals or sociocultural group.
Psychic representations/ social representations	Study of reality elements: grasped by the perception, represented in consciousness, and so constructed in images; respectively, characterized in the personal history (psychological world) or collective history (social world).
Symbolizations, symbolisms	Study of unconscious mental or underlying sociocultural processes, in which objects in general and ideas come from other elements due to specific qualities or general aspects in common, then arising symbols that carry elements invested in those initial objects and ideas.
Perceptions/ viewpoints/ perspectives	Identification and understanding of what is apprehended through the sensory organs – immediately or intuitively – having as object the phenomena in their qualities.
Life experiences/ realizations	Representations on both the perceived and the remembered of what was lived (experienced, thought); occult senses of life experience; not-said meanings about the knowledge historically acquired and accrued by people. Study of the accomplishments: interpretation of conceived inner elements, brought vividly to mind, and understood clearly by the subjects.
Metaphors/ analogies	Interpretation of semantic translations and sense similarities, respectively; found in the subjects' discourses and crucial for the meaning's discussion in regard to the matter under study.
[Ego] defense mechanisms/ [psychosocial] adaptation mechanisms	Psychoanalytic study of defenses in unconscious processes (repression, denial, etc.), protectors for the subject (for their ego) against their impulses and ideas unacceptable to their consciousness. Psychological study of adaptations in psychosocial processes that allow the subject to organize themselves facing inner (psychic) and/or outer (social, cultural, environmental) demands.
Adherence and non-adherence to both prevention and treatment	Understandings of psychological-psychoanalytical and/or socioanthropological motives/reasons according to which people fulfill - correctly or not - clinical indications, recommendations, requirements and plans set by health professionals.
Stigmas	Psychosociological study of the impact of an individual condition, which prevent them from full social acceptance; interpretation of people's life experiences seen in their external signals, which exclude them from groups that follow the biological, psychological or sociological norm.
Care/ comfort	Studies on attention and protection needs of ill people living in unfavorable conditions and situations, aiming at improving their physical, psychic and social being.
Reactions and roles of professional and home caregivers/ burn-out	Study on how problems are experienced by health professionals, relatives or related people due to care of sick or disabled people. In particular, the dynamics of fatigue syndrome with the representation study of both the exhaustion phenomenon of providing care and the psychological management of overwork with ill people.
Facilitators/ bridges and barriers of approaches	Dynamics study of factors determining better or worse outcomes of diagnostic, therapeutic or preventive approaches, from the viewpoint of people affected by health problems or of their caregivers.
Narrative review of literature	Examination of published scientific studies with qualitative approaches, equivalent to systematic literature review (common in quantitative approaches); discussion of several conclusions of studies conducted with methodological rigor, including subsequent content analysis of the examined and selected material.
Metasynthesis	Controversial imitative version of meta-analysis (originally used for quantitative studies), a technique for qualitative studies; the purpose is to synthesize conclusions of several researches published in scientific journals and selected according to the focused object; performed through a search in electronic databases, generally of a few recent years.

**Table 3** - Currently valued subjects in quantitative research in health areas.

Usual constructs in quantitative methods	How they are established
Frequency/ incidence/ prevalence/ outbreak	Study of the number of occurrences in a time interval in a population. Main epidemiological measures of how a certain event is distributed and associates to the supposed cause through studies of health-disease process, defining: the number of new cases of a certain disease in a given time period (incidence), and the total number of cases (new and old) of this disease at the same period (prevalence). Outbreak: measurement study of sudden spontaneous occurrence or increase of diseases in a population, usually in unfavorable circumstances.
Risk factors/ survival factors	Theoretical establishment of elements whose effects are generally unfavorable to health, based on the probabilistic study of an event that will occur when the population is exposed to it. Theoretical establishment of elements from measures of life's continuance after a successful medical intervention or under adverse conditions. Used in inferences about treatment effects, prognostic factors, and others.
Retrospective/ prospective studies/ randomized controlled trials/ follow-up	Studies in which collected data are related to past events or the purpose is the observation of events which supposedly will occur. Follow-up as a measured action to control, guarantee or increase the effectiveness of previously applied therapeutic or prophylactic measures.
Clinical findings, signs and symptoms/ syndromes/ disorders	According to manifestation frequency and occurrence of causal simultaneity of manifestation, establishment of elements as indicative of diagnostic presentations; descriptive determination of correlated clinical manifestations in affected individuals and populations, aiming at therapeutic and prophylactic proposals to health problems
Diagnosis/ prognosis/ progress/ treatments/ managements/ outcomes	Theoretical determination of the nature and multiple conditions in regard to clinical entities and health approaches; concepts basically constructed from mathematical means from populations affected by diseases and chosen to be studied, aiming at nosographic classifications, therapeutic plans and quality of life planning
Advances in treatment/ controversies/ strategies/ updates/ trends/ disease impacts	Determination of new therapeutic management from statistical studies; systemized discussion concerning to polemical scientific issues for both clinical activity and literature; action lines proposed or taken in therapeutic behaviors or clinical approaches as well as health policies; new complementary knowledge on clinical entities; change trend on health issues over the time; measures of health dysfunctions, especially when suddenly generated by a disease, through scales or questionnaires based on behavior changes, patients' quality of life, and others. Each entity described above is derived from quantified observations under given situations or conditions
Effects/ markers/ impairment reduction/ predictors	Systematized studies of spontaneous or programmed action concerned to several elements found in individual or population clinical progress or under environmental influences; as well as elements for the application of planned resources, associated with the occurrence of certain human behaviors, in order to reduce the risks of health damage
Algorithms	From a conception of mathematics and, later, of information technology, a chart with a set of defined therapeutic managements was adapted to Medicine, arranged in choice order to be employed successively until reaching a clinically acceptable resolvability for a given health disorder
Cost-effective relation or analysis	Calculations to produce optimal clinical and medical/social outcomes with the purpose of controlling expenses of human, physical and financial/political resources and other similar resources, available or requested to the health sector
Quality of life	Measurement of essential or distinctive characteristics of people's life under certain conditions. Specifically, measurement of ill individuals' perception of their own status in a system of cultural values where they live and in regard to their expectations and personal patterns
Health-related quality of life	Measurement with multidimensional instruments but with special evaluators of individuals' perception of their own symptoms, impairments, disabilities and others
Believes and attitudes	Measurement, using scales, of both frequency and intensity of certain opinions and postures related to a certain event of health-disease sphere.
Surveys	Study based on a sample of people, through the measurement of psychosocial facts or their opinions; questions asked and analyzed for an eventual intervention in the population
Evidence-based medicine/ meta-analysis	Study grounded on proofs ("the best evidences"), updated to the decisions on patient care; use of both medicine basic science and clinical research, respectively: their exactness and precision related to diagnostic tests (including clinical examination); strength of prognostic markers (as clinical event predictors); and efficacy and reliability of therapeutic and rehabilitative/preventive decisions. Targeting the analyses of a large set of scientific studies, statistical methods are used to match results found in the many studies available in electronic databases.
Systematic review of literature	Quantified study on recently published scientific information, focusing on the range of issues about a subject searched in databases.
Psychosomatic profiles	Studies of types, patterns, personality traits or characteristics found in statistical correlation with certain diseases or syndromes.
Lifestyles	Tabulations of habits, behaviors, moral patterns of people who have health problems.
Behaviors	Classificatory study of attitudes as well as physical, psychic or social manifestations, evidenced in individuals or groups, as responses to intrapersonal or environmental stimuli.
Stress	In material physics, the body behavior under mechanical action. By a reductionist analogy for human behaviors, it is a classificatory study on personal reactions to physical, psychic or environmental stimuli, which disturb one's balance.
Coping mechanisms	Theoretical determinations of adaptation to environment based on people's choices, which would increase their behavior control or improve their psychological comfort.

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