METHODOLOGICAL LANGUAGE - Part 2

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SUMMARY

The position of our country within international scenario has been increasing and Brazilian medicine follows this development. For this, it is our responsibility as human sciences professionals the adoption of modern principles ruling the preparation and publication of scientific papers and, among those principles, quality methodological criteria must be complied with. With this purpose, this inter-department and inter-disciplinary group of the Medical College of the University of S-o Paulo presents to Acta Ortopédica Brasileira a glossary of the terms that are frequently used in scientific methodology and related areas, such as epidemiology, statistics, and library sciences, added by some names and

abbreviations of entities referred to on research programs. This combination of words, titles and abbreviations shall be of a great help to those who, by knowing them, shall be closer to the scientific community, enabled by the co-living, participation, discussion and engagement, which shall lead to a better understanding and shall target the improvement of their projects and publications.

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Keywords: Glossary; Controlled Vocabulary; Methodology

- **172. Absolute accuracy:** is the accuracy directly specified and in the same estimate unit intended for calculation.
- **173.** Almost randomized: an almost random way to assign participants to comparative groups; e.g., odd/ even days.
- **174. Anatomy review** is a study in which anatomical pieces are dissected and diagnostic issues or surgical techniques implications are inferred.
- **175. Approximation rule:** when the number to be disregarded is lower than five, it stays the same (1.23 = 1.2); if it is higher than five, the previous is added by one (1.27 = 1.3).
- 176. Assignment secrecy: a process used to avoid that groups assignment is known in advance in a randomized controlled trial. The assignment process must be made by an individual independent of any bias from the assigning individual, which is achieved by assigning somebody not participating in subjects' recruitment process.
- **177. Association measurement:** measures the magnitude of the association between exposure factors and a disease (relative risk; odds ratio).

- 178. Attributable risk: is the additional risk of a disease after an exposure, in addition to that determined by an individual not exposed to the risk factor.
- **179.** Average life: it is the arithmetic average of years of life of some individuals in a group.
- 180. Average lifetime: is the average lifetime of a population.
- **181.** Average: is defined as the sum of observed values, divided by the number of observations.
- **182. Be:** a useful term in scientific language; the power of creating reality; it is the specific use of the verb to be in scientific language. It is like the 'Once upon a time' in a literary context.
- 183. Bias: error or systematic deviation from the study.
- **184.** Bibliographic research: is the search and selection of bibliographic information related to a given topic.
- **185. Bibliographic Review:** is a non-systematic review in which researchers select the most important papers from literature according to their opinion, without specifying selection criteria. It points out failures and strengths of

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Received in: 06/20/05; approved in: 01/31/06

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many studies on the topic, criticizing or praising, and summarizing what is really important about the theme. Usually, for this kind of review, the individuals most experienced with the topic are chosen.

- **186. Biological plausibility:** is one of the five Hill's principles expressing that the correlation found in a study should be consistent to the knowledge already available for the matter.
- **187. Bounding bias:** these are systematic errors occurring at sample selection.
- **188.** CAPES Journal Portal: provides access to full texts of articles published in National and International Journals (8,000) in all areas of scientific knowledge. Provides availability to other databases.
- 189. Case series: the same as case report, with more than ten individuals.
- **190.** Case(s) report: is a kind of study reporting a technique employed in one or a group of individuals constituted of up to ten individuals. Groups with more than ten subjects would constitute a case series. This kind of study is not reproducible and doesn't support conclusions.
- **191. Checking bias:** it occurs when measurement methods are systematically different among patients' groups.
- **192.** Clinical relevance: is the degree of applicability of a given knowledge to daily clinical practice.
- 193. Clinical research: is a set of activities using human beings as units of analysis, of which objective is to develop or contribute to a piece of knowledge that could be applied in ill or healthy individuals in similar clinical conditions. These are researches of which results may corroborate or directly oppose clinical practice using unquestionable clinical variables.
- 194. Clinical significance: This is not a statistical term and depends on interpretation. It refers to a sufficiently large difference seen between groups to be regarded as clinical. Studies can be statistically significant but clinically insignificant.
- **195.** Closed population: is the universe not changing in size during the period of investigation;
- **196.** Conducting bias: systematic differences on the care provided, different from the intervention being tested.
- **197.** Confidence interval: is an interval within which the true value of a variable (or parameter) is expected to be found; in health sciences, a confidence interval of 90% 99% is employed.
- **198.** Confusing bias: it occurs when two factors are correlated and the effect of one is confused or distorted by another's effect, e.g., the conclusion that physical activity reduced the risk of coronary disease could be due to the fact of studied patients smoking less.
- **199.** Confusing variable: is included in the systematic error and generates worthless study results.
- **200. Consent term:** is a legal document signed by a participant in a research or by his/ her legal representative, basically intended to protect the participant and also to protect the researcher and the institution.
- **201. Continuous variable:** a variable of which potential values form an interval of real numbers resulting, usually, from a measurement, such as weight, height and blood pressure.
- **202.** Critical mass: a group's set of thoughts that is enough to, both in quantity and quality, allow, provide and sustain a given action or behavior; a minimum amount of thought towards a certain matter enough to sustain an approach, action, or behavior.
- 203. Cutoff point: term used for pre-establish P value, which, in health sciences should be between 90% and 99%.
- **204. Death rate:** is the ratio of deaths caused by a disease and the population with the disease.
- **205. Dichotomic variable:** a variable in which there are only two available answers, such as yes/ no, ill/ not ill.
- **206. Discreet variable:** quantitative variable of which potential values form a limited set of numbers usually resulting from a count, e.g., number of children.
- **207.** Experimental unit: is the smallest unit of a population in which the response to n applied treatment is not affected by other units.
- **208.** Expert opinions and consensus decisions: these are usually published in journals as update articles or scientific editorials, usually having a single responsible author who issues his/ her personal or

- group opinion, therefore, with no proven scientific evidences.
- : quality model to be followed.
- : method or object to describe the magnitude of an amount, used as a reference to enable measurement universality.
- **209.** External validity: the same as applicability; are valid the results achieved in a population when those are applied to other populations? Are the results achieved in women valid for men?
- 210. Fashion: is defined as the most frequent among many collected values.
- **211. Following bias:** these are systematic differences between comparative groups in terms of losses or exclusions in a study result.
- **212.** Follow-up: checking of an intervention's endpoints in one or more moments after the intervention is finished.
- **213. Golden standard:** procedure or measure broadly accepted as being the best; it is used as a group for comparison.
- **214. Health:** according to the World Health Organization (WHO), it is the full status of physical, mental and social welfare, and not only the absence of diseases
- **215. Hill's principles:** established by Hill, they provide a referential for the analysis of cause relationships in epidemiologic studies.
- **216. Impact index:** is the number of times a study is referred to in indexed journals in the last two consecutive years. It is published by the Journal Citation Report- ISI (Institute Scientif Information).
- **217. Incidence:** is the number of new cases of a disease or event in a population, during a specific period of time.
- **218. Index Medicus:** is a catalog of the U.S. National Medicine Library and the major reference work for medical and biomedical area; it's composed of keywords that retrieve information in research.
- 219. Index: a list in alphabetical order.
- **220. Indicators:** set of indispensable information to the production and/ or analysis of science and technology.
- **221. Individual:** an element in a population; other terms are also used with the same meaning: elements, subjects, among others.
- **222. Induction:** reasoning that starts from the results of a specific circumstance to conclude about a theory. Statement based on the finding of a constant relationship between two or more phenomena and concludes by explaining that relationship with a general theory (from specific to general).
- **223. Infer (to):** in biostatistics, it means to come to a conclusion; it also means to extrapolate, that is, a conclusion in a sample is also valid for a target population.
- **224. Inference:** method that enables to draw conclusions from reasoning. All operations by which the truth of a proposition is accepted as a result of the nature of its relationships with true propositions.
- 225. Instrument repeatedness: an instrument's property of providing similar results when applied at different moments, since conditions are not changed.
- **226. Intention to Treat:** an intention-to-treat analysis is the one in which all participants in all groups are followed up until the end, regardless of what occurs to each of them.
- **227. Interdisciplinary:** is a term used to define a joint action of various professionals within their individual competence areas, interacting in common areas, where all people have some knowledge regardless of specialty, and ultimately targeting the improvement of full human health status.
- **228. Inter-individual variable:** distinguishes differences among members in a population sample.
- **229. Internal validity**: refers to methodology adequacy.
- **230. Internet:** network connecting millions of computers worldwide using compatible communication patterns and having the ability of contacting each other and sharing data.
- **231.** Intra-individual variable: the difference of values achieved in a same individual (e.g., blood pressure at different moments).
- **232. Intra-investigators bias:** these are systematic differences in evaluation between investigators participating on the study.
- **233. Introduction:** is the initial section of a paper, when used resources, difficulties and limitations are described.

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234. ISI: Institute Scientific Information; an entity evaluating approximately 2,000 journals a year for WEB of Science coverage;

235. Journal Citation Reports (JCR): database informing titles of journals and their corresponding impact factors.

236. Keywords: terms characterizing a scientific study in its indexation and information retrieval.

237. Language: a native tongue of a country. It is the pure, correct form of language, without expressions.

238. Level of evidence: is a classification used to categorize scientific papers based on evidences and on the overall consistency of the results; it is the hierarchy of evidence strengths of researches developed for medical decisions.

239. Levels of evidence, according to "Guidelines project" of the Brazilian Medical Association published in 1999 and 2000.

Level 1- Systematic reviews

Level 2- Randomized clinical trial - Mega Trial

Level 3- Randomized clinical trial – types alpha and beta (n= 200 to 300)

Level 4- Prospective cohort study

Level 5- Case control studies

Level 6- Case series

Level 7- Expert opinions

Level A – Systematic reviews and randomized assays

Level B - Prospective studies with control and cohorts

Level C – Retrospective studies

Level D - Expert opinion and consensus decision.

240. Levels of evidence, according to COOK, SACKETT, CHEST, 1992.

241. Life tables: are equations used to foresee a chance of a person to live up to a x given age, from the moment of birth or any other age in life; the higher the initial age for calculation, the higher the over-time likelihood.

242. LILACS – Latin American and Caribbean Health Sciences Literature – an on-line cooperative database of BIREME system.

243. Linear regression: is the straight line obtained in a graph depicting a trend on positioning of points marking quantitative variables. The line that best adjusts is the one resulting in the lowest sum of squares of those points' distance with the straight line.

244. LIS: Health information finder.

245. Literature review (non systematic) is a scientific paper in which the author makes a summary of existent literature on a given topic. There are no selection rules, but those reviews are usually made by well renowned professionals; they are broad, and contain relevant findings. This kind of review is different from the Systematic Review, because it does not use statistics.

246. Longevity: a long, extended life.

247. Masking: to keep the allocation secret to study subjects or investigators.

248. Measuring bias: these are systematic differences in the way in which endpoints are evaluated, measured or diagnosed.

249. Median: is defined as a value that, since all results are sorted, leaves the same result numbers in each side.

250. MEDLINE: database produced by the U.S. National Medicine Library. It indexes millions of articles published in selected journals. It is the database in international literature in medical and biomedical areas.

251. Memorial: is a narrative, historical and reflexive autobiography; it is an articulated and intentional retake of a Résumé's data.

252. Mesh: common terminology in research, which provides a consistent and unique mean to restore information.

253. Meta-analysis: application of statistical techniques in a systematic review. **254. Method:** is the study design; it is the rational path or process to reach to a given end.

255. Methodological quality: it's the extent to which the design and performance of a study may have contributed to prevent systematic errors or biases.

256. Mission: is the reason for being and reflects an entity's values. It is hardly changeable.

257. Model: symbolic form of a physical principle expressed as an equation or formula.

258. Monograph: a paper personally prepared about aspects in a discipline or sciences, usually exposed in written; it is a kind of scientific paper of which focus is addressed to a single topic, in a special approach.

259. Morbidity: is any change in a well-being condition. Morbidity may be expressed with incidence or prevalence rates.

260. Mortality: Number of deaths occurred in a total of subjects.

261. Multidisciplinary: is a term used to define the joint action of various professionals within their individual competency areas, acting independently and aiming as a final goal the improvement of humans' full health conditions.

262. Multiple regression: is the one enabling the calculation of the quantitative dependent variable, based on two or more independent variables.

263. N: population size.

264. n: sample size.

265. NNT – Necessary Number to Treat: is the number of patients that need to be treated to predict an unfavorable endpoint.

266. Non-systematic bias: these are errors, sometimes positive, sometimes negative, which end by making each other null.

267. Objective: is the proposal or purpose of a study.

268. Odds Ratio(OR): it expresses the chance of cases (people) exposure divided by the chance of inter-control exposure. It's the most important effect measurement in case-control studies. It is also called cross-products ratio. An odds ratio of 1 indicates that there is no difference between groups. For undesirable endpoints, an odds ration below 1 means that the intervention was effective in reducing the risk of that endpoint; it's a statistical test characterized by OR to determine the advantage or disadvantage of an event compared to another, in case studies in which the number of controls is previously determined by the investigator.

269. ODDS: is defined as the probability of an event to occur, divided by the probability of not occurring.

270. Open population: is the universe changing its size during a research period, due to births, deaths, and migratory phenomena.

271. Over-time: lifetime exceeding a given limit.

272. Pairing: a procedure in which the participants or groups are paired (e.g., based on prognostic factors) and a member of each pair is assigned to experimental group and the other to control group.

273. Panel: is a presentation of papers with a same topic addressed under different points of view, all freely exposed, with no references to previous positions of any participant.

274. Parameter: numeric measurement used for describing some population's characteristic; it is usually represented by Greek letters.

275. Pedagogic method: is a specific way of organizing knowledge, taking programs' objectives and populations' characteristics into account.

276. Peer-Review: Technique for reviewing a product, in which a colleague (peer) of the designer or programmer reviews a developed product, trying to find errors or to provide suggestions for improvement.

277. Placebo: Inactive substance or procedure (producing no effects), administered to a participant or group with the purpose of comparing the effects of a drug or intervention.

278. Population: is the set of elements of which we want information; every research determines a universe to which the study results shall be applied.

279. Predictive value of a negative test: probability of an individual with a negative test to be a person not showing the event that is object to investigation (a certain disease).

280. Predictive value of a positive test: probability of an individual with a positive test to show the investigation event (a disease).

281. Predictive variable: the one occurring before the fact; variables such as risk factors.

282. Prevalence ratio: is achieved by dividing two prevalence rates: the group or population prevalence, which has the characteristic or factor suspected of being determinant of a disease, and the group (or population) without this suspected characteristic. Although both prevalence rates are obtained simultaneously, that is, it does not consist of a longitudinal study; prevalence

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ratio can be useful in determination or even in causality studies.

- **283. Prevalence:** number of individuals in a population presenting with an event (e.g., clinical condition) in a given moment.
- **284. Probability:** probability of an event A is its relative frequency of occurrence or the proportional number of times an event occurs in a high number of repeated attempts, under virtually identical conditions; it is the fraction between the number o occurrences and the number of experiments performed; it is a quantitative evaluation based on the possibility of an event to happen; it is the ratio between the number of favorable events and the number of possible events in any phenomenon.
- **285. PROBE:** Electronic Library Program is an Online Library containing full texts of international journals articles.
- **286. Pseudoscience** (**Quackery**): is used for falsely promoting a procedure or a drug; the process of responding to a hypothesis is not made with an appropriate design and the evidences found have biases that make them null.
- **287. Publication bias:** a bias in published literature is when a research publication depends on the nature and orientation of the results; studies in which the intervention is not proven to be effective are not published.
- **288. QUALIS:** a CAPES criterion to categorize and index Scientific Journals. It uses letters from A to C.
- **289. Quality of life:** according to the WHO, it is "an individual's perception of his/ her own position in life within the context of culture and values system in which he/ she lives and towards his/ her objectives, expectations, standards and concerns".
- **290. Questionnaire:** is a way to collect data in a research. Participants can be directly asked or requested to fill a form (self-filling).
- **291. Randomization:** is the ability of giving participants the same opportunity by distributing them randomly; stratified randomization is used to assure that equal numbers of participants with a characteristic allegedly influencing prognosis or responses to an intervention are allocated to each comparative group.
- 292. RCT: Randomized Controlled Trial a randomized controlled trial.
- **293. Reasoning:** is a thinking process by which knowledge are logically arranged so as to produce new thoughts.
- **294. Regression:** is the ability to predict a value based on knowing the other, i.e., of predicting y by knowing x.
- **295. Relative accuracy:** is the accuracy not directly specified as the absolute accuracy, but proportionally, as a percentage to the true value.
- **296. Relative risk:** is the chance of a group member to develop a disease after some exposure compared to the chance of another non-exposed group member to develop it; it is the probability of a disease in an exposed group divided by the probability of a disease occurring in a non-exposed group; a RR = 1 indicates that the disease probability is identical for both groups;
- **297. Representative:** a representative sample is the one providing us an exact portrait of the population from which it was withdrawn.
- **298. Reproducibility:** Refers to the degree in which the results achieved by a measurement or checking procedure are the same when reproduced in a new scientific experiment.
- **299.** Research line: domain or thematic core of a research activity characterized by the development of studies with common methodology and objectives.
- **300.** Research project: research activity on a topic or specific and well defined object, developed with pre-established objectives, methodology and length of time, performed individually or in conjunction by a team of researchers. BIBLIOGRAPHIC REVIEW.
- **301. Research subjects:** those are the individuals participating in a study studied subjects; many times referred to as individuals, cases or elements.
- **302. Research:** is the basic activity of science questioning and constructing a reality.
- **303. Researchers:** graduated or post-graduated members of research teams, formally not occupying teaching positions, either formally employed or not by the Institution, but contracted to conduct specific research projects.

- **304. Response absence bias:** it occurs when some interviewed individuals refused to answer to some or all questions.
- **305. Response bias:** it is the systematic difference between a true and an achieved response, and is correlated to the way questions are made or event to the way questions are answered.
- **306. Result:** is the systematic presentation of the results achieved with no personal interpretations.
- **307. Reversibility:** one of Hill's principles that means, in epidemiology, that if the exposure is interrupted, the risks for the disease are changed.
- **308. Round table:** intends to present different points of view about a same topic, but starting from a presentation delivered by one of the participants.
- 309. RR = N1 (disease) / N2 (exposed) : N3 (disease) / N4 (non-exposed)
- **310.** ScieLO: (Scientific Library on-Line): electronic on-line scientific library; a model for on-line cooperative publication of scientific journals on the Internet; a database linked to the World Health Organization and to the Pan-American Health Organization.
- **311. Science Citation Index:** multidisciplinary database from where summaries of scientific journals indexed (5,300 journals) are retrieved.
- **312. Science Direct:** a product by Elsevier for research and retrieval of full article texts.
- **313. Scientific evidence:** a sequence of mathematical and logical events supporting clear evidences that makes them acceptable as true or not.
- **314. Scientific method:** is a conceptual process of empirical organization of facts and the correlation in theories and inferences structure. It represents a philosophical ideal explaining how science advances ruled by a methodological and systematic application of knowledge, in the sense of reducing the probability of alternative explanations for observations.
- **315. Scientific paper:** aims to prove a thesis by means of ideas, which is a solution proposed to a given problem within a given topic.
- **316. Scientific Theory:** it's a coherent and inter-related structure of propositions and principles resulting from scientific evidences that would explain phenomena and facts.
- **317. Scientific truth:** it is the simplest explanation of all the truth known about unquestionable facts (Ockam).
- **318. Scirus:** a product by Elsevier Bibliographic research basis for medical and multidisciplinary areas.
- **319. Selection bias:** is related to systematic differences between comparative groups in terms of prognosis or response to treatment.
- **320. Seminar:** has as an objective to lead all participants to deeply think about a given problem, from texts and in groups; it's a smaller meeting, like a study group.
- **321. Sensitivity:** ratio between the number of people showing a positive test and the number of people with the disease.
- **322. Significance level:** is a value, expressed as a percentage, defined by a researcher to decide if a difference detected in the study corresponds to a statistically significant difference. The significance level is represented by alpha letter. In general, this value corresponds to 1% or 5% (0.01 or 0.05).
- **323. Single-tail test:** a test of which alternative hypothesis is a inequality, that is, when we desire to test if the observed value is higher or lower than the critical value corresponding to null hypothesis.
- **324. Speech:** is a conference made in a less formal situation; it is usually inserted in a context of a larger event or may be delivered separately; it is delivered by a single person and may be followed by debates with audience.
- **325. Statistical power:** is the measurement of assurance of avoiding a false-negative conclusion that an intervention is not effective when in fact it is; or the probability that the null hypothesis is rejected if it is really false.
- **326. Statistical significance:** a result is statistically significant when analyzed by a test confirming that the potential of that result to be randomly achieved is minimal.
- **327. Statistical test:** determines if the result achieved is statistically significant, i.e., if the possibility of occurring equal or lower values compared to the one randomly achieved is low.

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- 328. Studied population: the same as target population.
- **329. Study protocol:** a document addressing the description of the study in its essential aspects. Information concerning study subjects, researchers qualifications and all responsible entities. It must be approved by the committee on ethics of the institution where the study will be conducted.
- **330.** Study repeatedness: quality of study results that enable them to be reproduced in other scientific experiments, which end by being similarly read from other scientific experiment subsequently conducted.
- **331. Study unit:** or sample units are individual elements of a population of interest, such as a person, family, block, city etc.
- **332. Summary or Abstract:** is the concise presentation of relevant points in a scientific text, which must highlight the objective, the employed method, the results and conclusions.
- **333. Summary1:** is a list of the major sections of a study arranged according to a sequence of occurrence in the text and indicating the initial page.
- **334. Summary2:** is the English version of 'Resumo" in Portuguese.
- **335.** Survival time: is the estimated lifetime counting from a given age; it identifies a probability of an individual to survive (S) beyond time (t).
- 336. Survival: continuous duration in space and time.
- **337. Symposium:** is a meeting specifically designed to experts, who gather together to discuss a previously determined topic.
- **338.** Syntax: part of grammar addressing the arrangement of words to form sentences.
- **339.** Systematic bias: these are systematic errors in response or evaluation; they may make a research null. They are difficult to detect.
- **340.** Systematic review: is a review of literature articles answering to a same clearly asked question, using systematic and explicit methods to identify, select and critically evaluate relevant researches and to collect and analyze data from the studies included in the review. Statistical methods (meta-analysis) may or may not be analyzed, and the results of included studies may be synthesized.
- **341. Talent:** it is associated to the satisfaction and pleasure of doing something; hardly changeable.
- **342. Target population:** also named studied population, is composed of distinct elements having a certain number of characteristics in common (at least one); this common characteristic should clearly bound which elements belong to the population and which elements don't. Those elements, called population units, are the units of analysis of which information will be collected.
- **343. Temporality:** it is the time when events occur; exposure must always come first than disease; because cohort studies follow up exposed and non-exposed groups, they are named longitudinal. Cross-section studies follow up

- the exposure and the disease simultaneously, and they are regarded as having no temporality, which constitutes a limitation of the cross-section studies.
- **344. Test power:** corresponds to 1 (the probability of accepting the null hypothesis when this is false) and indicates the probability of a right decision based on the alternative hypothesis. It is usually interpreted as an opportunity to detect a real difference in averages or proportions. For example, an 80% power means that, if indeed any difference exists, there will be a probability of 80% of detecting it.
- **345.** Thesis: is a document presenting the results of a paper on a specific and well bounded topic.
- **346. Trend:** is used to refer to a correlation or potential effect that is not statistically significant.
- **347.** Uniterms: please, refer to describer or keywords.
- 348. Universe: the same as population.
- **349.** Useful life: term used for pharmaceutical products; it's the time during which a drug remains active; used for human beings, it means the productive lifetime for a given variable.
- **350. Validation:** is the process determining if a procedure or method is correct.
- **351. Validity of an instrument or technique:** it is the degree in which a measurement really measures or detects what it's supposed to measure.
- **352. Variability:** is the distance between limit values in a sample. The flatter the Gauss curve, the higher the variability.
- **353. Variable:** is an amount that varies; a factor that might have different values.
- **354. Variance:** calculated for populations; it's the sum of discrepancies squares divided by total sample.
- **355. Volunteer:** these are individuals understanding risks and benefits of being submitted to a research and who give their consent to voluntarily participate in an experience.
- **356. Vulnerability:** status of people or groups that, for any reasons or purposes, have a reduced self-determination capacity.
- **357. WEB of Science:** database of references by ISI containing information about scientific production worldwide since 1974; it enables to retrieve studies published on the most important international journals, showing bibliographic references comprised in the studies, and also informing about papers mentioning them with corresponding references.
- **358. Weighing:** thinking, meditation, consideration, importance, relevance, and weight.
- **359. WHO:** World Health Organization.ses, have a reduced self-determination capacity.

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