

Statistical Data: (Empirical) Facts or (Theoretical) Fictions

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The term “(empirical) facts” in the heading, here as usually, refers to the outcomes of observations, i.e. to observed objects, states or events of the world, and so does the term “statistical data”. We use the former term rather for the outcomes of individual observations and the latter for aggregations of observed facts such as (relative) frequencies, frequency distributions and their statistics. The word “fictions”, here as usually, refers to non-observed, imagined “facts“, i.e. mental constructions. The term “theoretical fictions”, or synonymously “theories”, refers to a subset of the set of fictions, i.e. to fictions from which predictions of empirical facts can be deduced and put to test by comparison with the outcomes of observations. In short: theories are fictions predicting facts. The requirement of testability forces theoretical fictions to be formulated in some language which permits the logical deduction of predictions.

In exceptional cases, e.g. in secondary analyses, the term statistical data may refer to (theoretical) fictions, e.g. to parameters of a theoretical distribution fitted to empirical distributions obtained in various primary studies. Such analyses, however, do not aim at knowledge about the theories generating the theoretical distribution and its parameters. They rather aim at information about the facts having resulted in the empirical distributions of the primary studies. Another case is public opinion research. Here, the frequencies of fictions held by respondents of some group or society may occur as statistical data. In that case, however, the statement of the respondents, that they believe into some fiction, is not a fiction itself but an observed empirical fact of psychological or sociological interest. Rarely, statistics seems to be applied seriously to purely fictitious, i.e. unobserved objects, states or events - disregarding, of course, purely theoretical work on probability or statistical models. Admittedly, definitions are arbitrary, but one would tend to assume a terminological consensus among statisticians, or scientists in general, that the term “statistical data“, at least as a rule, refers to (aggregations of) observed (or at least observable) empirical facts. Hardly anybody would regard statistical data as never referring to empirical facts.

The appearance of radical constructivism in philosophy of science forces us to have second thoughts about the status of statistical data. Radical constructivism argues that reality is not given and explored but rather invented or mentally constructed. Here we better avoid the concept of reality altogether, and better talk about empirical, i.e. somehow experienced, facts only, leaving open the question as to the nature their reality. We merely discriminate between mental facts observed by introspection, i.e. mental states, events or percepts, on one hand and physical facts on the other, i.e. states, events or objects, including our body, which are observed in the external world. Both may be conceived as real or fictitious depending on definitions. In any case, only the latter are accepted as objective empirical facts of interpersonal comparability and, therefore, as scientific data or as statistical data after aggregation. Introspective facts, as opposed to verbal reports which may or may not describe introspective facts appropriately, have been rejected as scientific data from the onset of behaviourist thinking in the early 20th century. Introspective facts are regarded as subjective, unobservable by outsiders and therefore inaccessible to interpersonal comparison. Even worse, they have been shown experimentally to be prone to all sorts of biases, (auto)suggestions, self fulfilling expectations, perceptual defence, wishful thinking etc. Since the cognitive revolution

later in the 20th century, introspective concepts reappeared in psychology as theoretical constructs, but never again as empirical facts.

On the other hand, psychology of perception teaches us, that we never directly experience facts of the external world. When we talk about the observation of such facts, we employ a misleading abbreviation for the observation of percepts, i.e. mental objects, states or events, which are merely interpreted as facts, i.e. objects, states or events, of the external world. Observing a tree means observing the percept of a tree which is interpreted as (elicited by)a tree. After life-long learning this interpretation is performed automatically, already in the hypothetical, pre-attentive phase of the perception process which has been studied experimentally but cannot be observed by introspection because of its speed to be measured in milliseconds. The resulting percept of a fact, however, differs from the fact, i.e. external object or event, which it assumedly represents, because a percept is a function not only of bottom-up information from the sensory system but also of modifying top-down information stored in memory. Therefore, depending on different states of memory, i.e. schemas, expectations, prejudices, motivations etc., some sensory input may result in different percepts or differing sensory informations may result in the same percept. Of course, without special training a percept is usually not recognised as a percept but immediately and cogently but erroneously experienced as a fact of the external world. We may assume and are naively convinced that, but we can neither prove nor even disprove, whether or not percepts represent such facts, since we do not have independent observational access to the world and its facts. We have it via percepts only, and only given the assumed but questionable representation.

Because we experience exclusively mental percepts and never the respective physical objects or events, only percepts can be empirical facts. Unfortunately, they are introspective facts and as such not accepted as scientific data - even if they are well discriminated from pure fantasies, imaginations or ideas. (That discrimination must be required, of course, because obviously different rules of (co)occurrence apply to different types of mental states and events like percepts and imaginations.) The unobservable facts of the external world, hence, are not empirical facts but theoretical constructs, i.e. constructs of a highly useful, usually implicit, theoretical fiction (Weltbild) called the „world“. That theory had to be changed in the past as a consequence of new observational experiences, e.g. from the Ptolomean system to that of Kopernikus-Kepler-Galileo or from the Newton system to that or those of modern micro- and macrophysics. Therefore, it is likely to have to be changed in future too, but for the prediction of every day life subjective mental experiences, i.e. the empirical facts proper, it definitely is a most successful theory. We do, and by experience can, rely on it in innumerable situations when developing expectations about future mental states or events, e.g. about the likely consequences of our behavioural decisions. In short: Only mental states or events, i.e. introspective data, are empirical facts. The, so called objective, external world with its objects, states and events is a mental fiction which, within limits and after corrections for biases, seems to predict the empirical facts of our subjective mental experiences for most practical purposes extremely well.

There are at least three kinds of (educational) implications of this state of affairs. They concern (1) life, (2) science and (3) statistics. Without attempting a comprehensive overview or treatment, we may glance at each of them from a psychological perspective, in order to trigger comments and controversies by specialists in those fields, i.e. (1) women and men of wisdom, (2) philosophers of science and (3) statisticians:

(1) For pragmatic and survival purposes, for the attainment of pleasant and avoidance of unpleasant mental experiences, we can and, perhaps, should better make use of the predictive power of the theoretical fiction of an external world and of the scientific theories tested for falsification against it as a reference theory. Most probably, reliance on that set of fictions will be much more expedient than resort to other prejudices, superstitions or beliefs of less proven predictive success,

even if the latter seem to satisfy better our fundamentalist needs for simple rules which make our mental experiences predictable and manageable. (The concept of a fundamentalist need is a tentative generalisation of Festinger's experimentally well established concept of a need to avoid cognitive dissonance, discussed in most textbooks on social psychology.) The theoretical fiction of an external world permits us to live and act fairly successfully - apparently in that assumed world. However, we better consider that hypothetical world as what it is, namely as a useful tool for making predictions, because that is what theories are and meant to be. We can make use of that tool and improve it but need not be dominated by its "reality" more than one is dominated by a tool. Moreover, we better do not let it cover the view on our empirical "world" proper, i. e. the view on our mental experiences here and now, i.e. sensations, percepts, imaginations, ideas, feelings etc.

For a theory-free approach to empirical facts, i.e. to our mental states and events, we may attempt to unlearn to interpret percepts as facts of an external world and learn to interpret them instead - and later, perhaps, to experience them - as what they are, namely ephemeral percepts, occurring here and now, and nothing else. The temporal renunciation of the predictive power of the theory of an external world may require some guidance, high tolerance for ambiguity and a purposeless state of need- and fearlessness. On the other hand, it may result in a new rational perspective of interest and, possibly, of significance for our life - particularly if not only the world, including our body, is conceived as a fictitious theoretical construct, but our "ego" as well. The view of a fairly rigid permanent world perceived by a fairly rigid permanent ego would, thus, be replaced by the view of a continually changing flow of ephemeral mental states and events, some conditional sequences of which, i.e. those of percepts, can be quite well predicted by the fiction of a rigid ego living in a rigid world.

(2) The credibility of scientific theories rests on the compatibility of their predictions with observed facts as criterion for their provisional acceptance or final rejection. That strict criterion distinguishes scientific theories, their statements and predictions from the persuasive power of opinions and beliefs in general which usually satisfy most questionable softer criteria of conviction like plausibility or social authority only. The adoption of the latter serves our fundamentalist need to avoid the honest but anxiety producing conclusion that we usually rely on assumptions instead of knowledge in our judgement and decision making, an admission requiring considerable tolerance of ambiguity. We rather avoid irrefutable probes, and even tend to overlook failures, of our opinions, as the insurmountable persistence of prejudices shows. In that situation, it is the resistance against the temptation of employing soft validity criteria which established the authority of scientific statements and predictions. After plausibility as well as personal and social authority have been discarded as criteria at least in principle, sufficient exposure to nontrivial empirical controls remained as the last and sole authority deciding about the validity of theories. Therefore, it is hard to admit that the predictions of scientific theories are not tested against observed empirical facts but against constructs or statements of a reference theory, i.e. the reference fiction of an external world, which itself cannot undergo empirical tests since, with good reason, the introspective empirical facts are not admitted as scientific data. As a consequence we have to admit that empirical controls of scientific theories do not exist and that scientific reasoning never leaves the realm of fiction. Obviously, that state of affairs completely undermines the authority of science or scientific statements and predictions at least for an authoritarian minded fundamentalist of low tolerance of ambiguity.

Given sufficient tolerance of ambiguity, however, the loss of an unjustified absolute authority of science can be put up with. After all, the fiction of a permanent external world has proved so successful in the prediction of the occurrence of empirical facts, i.e. percepts, under specified conditions, that compatibility of scientific theories with that reference fiction is most probably a relatively much better validity criterion for scientific theories than compatibility with other opinions or teachings appealing to the fundamentalist needs and fallible intuition of individuals, groups or

mankind by plausibility arguments, voting majorities like consensus or, worse, by the subtle or open social coercion of the popular, powerful or declared to be knowledgeable. The preference for theories tested against the reference fiction of a permanent world, of course, is open to questioning, but no convincing arguments for alternative beliefs come to mind as long as predictive success instead of social approval is the criterion for the usefulness of a (reference) theory. It remains to be seen, whether or not similarly hard scientific criteria and methods will and can be developed, which permit the testing of theories against proper empirical, i.e. mental, facts.

(3) As a rule, classical statistics is applied to data referring to facts “observed” in the external world, i.e. to theoretical fictions. Keeping that in mind in order to avoid the unjustified claim of analysing observed empirical data, there is no reason why useful fictitious constructs should not be analysed by any means or methods provided by science, including theories of measurement, data, probability and statistics. After all, we thus achieve the refinement of a fiction which proved useful in guiding our behavioural decisions aimed at bringing about desired mental experiences and avoiding undesired ones. Any such refinement improves and extends the predictive power of the theoretical fiction of an external world and of the theories tested against that reference theory. That is a most worthwhile endeavour from a pragmatic point of view, at least as long as it does not weaken our chances to unlearn our over-learned belief in a permanent world perceived by a permanent ego.

It is an interesting but open question how statistical methods can be applied in a theory free approach to our empirical facts proper, i.e. to our ephemeral mental states and events. As introspective data they can probably be analysed by and for some person only. Since the narrowness of mind limits the number of empirical facts which can be recognised simultaneously, it is the analysis of sequential data that is called for, e.g. by methods of single case statistics - or Bayes’s statistics, in order to deal with hypothetical expectations. It can be argued as before that such data are prone to biases, artefacts and illusions, but such criticism is besides the point. Here, we do not apply a nomothetical approach to the search for predictive rules employable by everybody as in the construction and refinement of our useful theoretical fiction of an external world. By the present theory free ideographic approach, we rather provide means to some person to systematise somewhat his mental events, without evaluating them as correct or erroneous according to some criterion derived from a physical, physiological or psychological theoretical fiction, as useful as such theory may be. In a theory free approach, we cannot but absolutely respect the experiences of persons and take them at face value whatever they are – percepts, illusions or even hallucination. The same argument holds against the objection that subjective mental experiences are modified by their observation. The assumed undistorted “true” experiences are theoretical constructs, which can be analysed only in terms of the hopefully useful but fictitious theory. Of course, we better make observations as easy as possible to the observer in order to produce results deviating as little as possible from the hypothetical undistorted facts. The only task a person should perform is the registration of his subjective mental facts. The computation and updating of frequencies, statistics, posteriors etc. should be left to technical devices which fortunately can be made available nowadays.

RESUMÉ

Des données statistiques se réfèrent normalement aux faits du monde extérieure, qu’ on ne peut pas observer directement mais seulement par leur représentations mentales, que sont nos faits empiriques propres. Les premiers ne sont que des concepts de la fiction théorique d’ un monde extérieure, que sert comme théorie de référence pour éprouver les prédictions des théories scientifiques. Cette fiction est probablement fausse mais utile par ses prédictions correctes innombrables des faits mentales empiriques dans la vie quotidienne.