

Theory vs Method**Theory:**

For a long time, theory has been considered to be the active contemplation of an object (rather than the passive reception of external effects). Nowadays, every discipline tends to have its own definition of theory:

- For instance, in the natural sciences, the demand for exact prediction is very high. Einstein's $E=mc^2$ is a scientific theory, not only because it describes and explains a certain relationship, but because one is able, through experiment, to demonstrate that the relationship is true. If a relationship cannot be demonstrated, it is not theory in the eyes of science.
- In the human sciences, the demand for predictive power is not as strong. The emphasis is rather on general statistical probabilities, or very detailed in-depth descriptions.
- Finally, in fine arts, theories tend to depend on philosophy.

Theory is related to research in the following manner:

- Theory seeks to describe, explain, predict. Research tests those descriptions, explanations, predictions.
- Theory seeks absolute truths. Research offers the way to test these.

Theories are generalized, while research is specific. A research strategy is a specific 'way of knowing', used to test the claims of a theory. Although research verifies theory, a particular theory does not necessarily prescribe research (a single research strategy can be used to specify any of various theories). However, there are usually 'good fits' between particular theories and research. For instance, it is fairly easy to conceive of a particular quantitative-experimental research strategy to test the claims of $E=mc^2$. However, it would be much more of a stretch to access Einstein's theory by means of qualitative research. Even research tactics are better suited for certain theories as opposed to others. Particle accelerators, for example, are great for testing Einstein's theory.

Theory production (and Testing):

Theory is produced in the following process:

1. First, observations are made about some aspect of the universe.
2. Then, these propositions are connected logically.
3. As a third step, a set of conclusions is drawn from steps 1 and 2.
4. All this is then linked to empirical reality.
5. Finally, the theory is tested.

As an example of this, consider the proposal of '3 categories of design evaluation':

1. First, a researcher observes that "evaluators of quality exist in the universe; it is possible to evaluate quality."
2. Then, the 'totality of evaluation' could be covered by 3 types of evaluators: receptors, producers, and the context (rules).
3. These 2 are combined in the following conclusion: "receptors, producers, and context evaluate quality."
4. Linked to empirical reality, this becomes: "There are 3 principal evaluators of graphic design quality: the public at large, designers, and the design profession."
5. Finally, this is tested in some way or another, through research.

Ranges of Theories:

- Positive versus normative theories: Positive theories are descriptive and explanatory. Normative theories are based on convention ("this is how we've always done it"). Both describe, explain, predict, but normative theories don't have the logical rigor of positive theories. Positive theories are testable according to scientific-mathematical laws, while normative theories are testable only by measures of

professional acceptance. Of these 2 'types', normative theories are the ones that abound in the design fields. It is also said that, while positive theories are 'predictive' and 'persuasive', normative theories are simply 'persuasive'. Design theories do not have much predictive power, but they do manage to persuade. Even without the stability of prediction, the fact of wide audience acceptance demonstrates that the theory is striking a deep and appropriate chord in local culture (and perhaps even in total human identity). Note an important point in all this: since both positive and normative theories depend on persuasion, it is not only normative theory that is complicit with cultural roots. The progress of science, in positive theories, has been projected as a smooth reality, but it really is not. The real case is a lot messier: typically, once a dominant paradigm is in place, it influences how a community receives and perceives new data (making it difficult to motivate the development of new theories).

- Large versus small theories: Theories differ from each other in scope, as well as rigor. At one extreme are very ambitious theories that are large in scope (the theories of gravity, relativity, and the grand unified theory). At the other extreme are small, localized explanations for things. At this scale, there is little functional difference between theory and fact-gathering. The primary difference between the 2 scales of theories is that large-scale theories refer to many connected facts, while the smallest theories refer to single facts. Of course, a 'middle range' is where one can still generalize, but focusing on a particular discipline, such as design.

- Polemical versus accepted theories: Particularly in the field of design, there are some theories that promote or defend a particular set of visual attributes, often by refuting other opinions (they tend to be normative, but not all normative theories do this). These tend to fail in the 5th step of theory production (testability), and are typical of design practice. Designers tend to discuss 'what should be done', while scientists refer to 'what might be'. However, the fact that many design theories cannot be tested, does not mean that they cannot be framed into research. Polemical theories do offer the conceptual material that can be framed into a research question (particularly in regards to style, composition, type, morphology, and place). Consider the following example:

While it is not feasible to test a belief in beauty (in a procedure for making beautiful posters), it is possible to make such posters and see if they are interpreted as beautiful.

More on the 6 Research Strategies:

Note: All of the following can be approached in qualitative or quantitative ways, although some tend more towards one of the 2 inquiry systems.

- Historical research: The focus of this theory is data creation/ acquisition, in a particular temporal context (the past; leaving the creation of data in the present to the next strategy, 'interpretive contemporary research'). Data is gathered through archival material or material evidence, or interviews of eye witnesses.

- Interpretive research: Together with the previous strategy, this concludes the range of interpretive research (data gathering through interpretation; these 2 strategies focus on the gathering of data, as opposed to the next 2, which focus on relating data to other data). This strategy tends to be qualitative, since the present allows for the direct involvement of the researcher with the subject being researched.

- Correlational research: Once data is gathered (either from the past or the 'present'), it is ready to be compared to other data. Here this comparison is done through the idea of 'necessary causal effect' (does something necessarily cause something else?).

- Experimental research: Another strategy for data comparison is to establish the effect of one variable on others by controlling its setting.

- Simulation research: This strategy basically re-interprets or controls 'time' in order to gather data (in this way, it is of the same type as the first 2 strategies). It tends to be quantitative, since it is related to Plato (anything 'platonic' is also 'quantitative'); Plato thought that any empirical thing is merely a copy of its immaterial and ideal form. Four general types of simulation include iconic models (physical representations), analogue models (environmental conditions), operational models (human interactions within settings), and mathematical models.

- Logical-argumentation research: This is one strategy that is a bit different from the rest. It is similar to correlational research, since it deals with the relationship between component parts, but pushes this to the limit of defining an entire system (instead of operating within an assumed system, which is what the other strategies do).