Beauty in Efficiency: An Experimental Enquiry into the Principle of Maximum Effect for Minimum Means

Authors
- da, Silva Odette
- Crilly, Nathan
- Hekkert, Paul

Publication Date
2016-03-29

Journal Title
Empirical Studies of the Arts

ISSN
0276-2374

Publisher
SAGE

Volume
35

Pages
93-120

Language
English

Type
Article

This Version
AM

Metadata
An Experimental Enquiry Concerning Heat. On the Equilibrium of Heterogeneous Substances. The thermal efficiency of a heat engine is the percentage of heat energy that is transformed into work. Thermal efficiency is defined as:

\[ \eta_{th} \equiv \frac{W_{\text{out}}}{Q_{\text{in}}} = 1 - \frac{Q_{\text{out}}}{Q_{\text{in}}} \]

The Carnot cycle achieves maximum efficiency because all the heat is added to the working fluid at the maximum temperature \( T_H \) and removed at the minimum temperature \( T_C \). This efficiency is maximized simultaneously with the maximum of the total output of an ensemble of large number of agents all working for that output. The Zipf's and Pareto's laws naturally come out from this calculus of variation. This efficiency provides a possible measure of performance. A summary is given in [5] about several experimental works checking the rule of least effort. The idea of least effort for human and animal systems is very appealing and even fascinating especially if it can be used for quantitative study in the same way as many variational principles in physics (stationary action, least time, maximum entropy etc.). However, no such implementation has been realized to date to our knowledge. The idea of maximum efficiency in science and engineering is not new. The Principle of Randomization provides protection, when we conduct an experiment, against the effect of extraneous factors by randomization. This means that we should plan the experiment in a manner that we can perform a two-way analysis of variance, in which the total variability of the data is divided into three components attributed to treatments (varieties of rice in our case), the extraneous factor (soil fertility in our case) and experimental error. We can classify experimental designs into two broad categories, viz., informal experimental designs and formal experimental designs. Experimental methods estimate the effect of the program compared to no programs at all when they are used to evaluate the effect of a program for which there are few good substitutes. From: Handbook of Labor Economics, 1999. Related terms They are certainly not the only method, for many others are available: surveys, content analyses, structured and unstructured observation, and others. As noted previously, all research searches for relations between concepts. All good research depends on being able reliably to infer that things are related in the ways a theory thought they would be—or in understanding what parts of the predictive apparatus needs revision.