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The Rule of Three:
A Technical Application of the New Math

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Abstract

Much has been written about choosing a sufficient sample size for scientific experiments. Indeed, it is a common misconception in the "scientific" community that large sample sizes are important. This paper presents groundbreaking research that flatly contradicts this absurd notion. Using solid principles of probability and statistics I will prove that as a sample size increases, the chance of confronting an anomaly grows prohibitively large. Such an anomaly would clearly invalidate any results obtained from an experiment. Furthermore, I will show that the maximum allowable sample size must be three.

Introduction

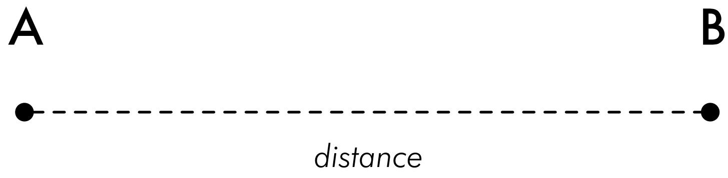
"Scientists" often claim to have taken a "random sample of the population" for their experiments (Science, 1999). Unfortunately, this is a misleading and often misinformed statement. What constitutes "random"? Which population are they talking about? How many people make up "the population"? How many people are necessary to make the sample random? In an effort to clear the muddied waters of science, this paper will strive to answer these questions so that, from this time forward, the scientific method will finally be accessible to everyone.

The History of Experimentation

Information about historical experiments is difficult to find. It is clear that experiments were taking place as far back as the 1970s; unfortunately, prior to this, the scientific record is spotty due to water damage (Old Newspapers, 1932; 1957; 1973-1978). Early experiments focused on pressing issues such as bellbottom saturation during the height of the disco era, or the effectiveness of a two-drink minimum. Clearly, experimentation provides vital statistical information about the state of the world around us.

Experiments are conducted for a variety of reasons. Often the researcher is attempting to measure an important variable in the population at large. Examples of this include: average moustache length, distance from point A to point B (*figure 1*), or frequency of occurrence of webbed toes in human males (O'Reilly, 1995). To find such

Figure 1. Common Measurement of Distance between Points A and B



information, the researcher must select from the population those people who are average in all respects. To find an anomaly would greatly skew the results. Past experimental practice involved large sample sizes in an attempt to overwhelm any anomalies that were encountered. This practice is deeply flawed, however, as recent research (Strømmen, 2003; Stump, 1999) has revealed that anomalies occur far too frequently to be overwhelmed with any reliability. Instead, it is more efficient to avoid the anomalies in the first place.

Choosing a Population

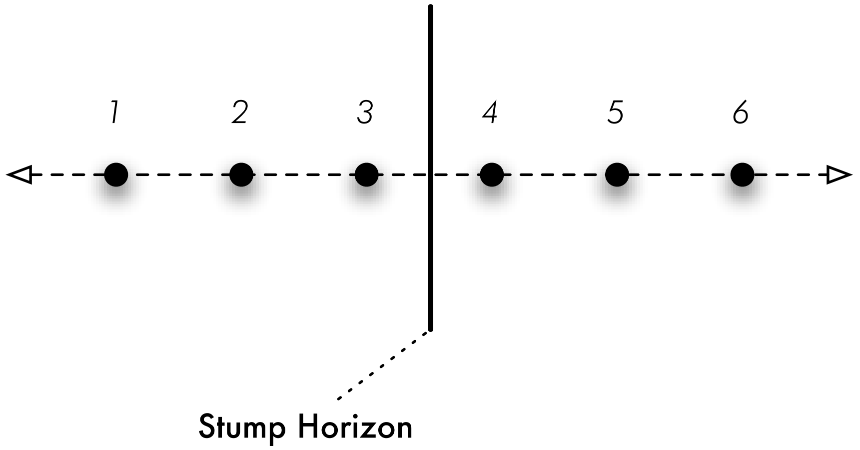
So how can we avoid these troublesome anomalies? Stump (1999) provided a landmark result that is only now finding well-deserved attention. He proved the astounding fact that for any given trait in any given population, 25% of that population will be anomalous. It is outside the scope of this paper to describe the amazing reasoning behind this result, but further trials have proved Stump's conclusions accurate in a number of situations (Strømmen, 2002).

Commonly, in scientific studies, populations of 20 to 40 subjects are considered to be adequate. Application of Stump's Law (1999) however, shows that this will yield between 5 and 10 anomalous individuals per sample. Clearly, such numbers will negatively affect the outcome of the experiment. In fact, it is simple to extend this trend: as the population size (N) increases the number of anomalies (A) will increase proportionally (*equation 1*). The completeness of Stump's Law allows it to be extended to all positive integers and all variables. This concretely proves that large populations are

Equation 1. Proportional Increase of Anomalies with Increase in Population Size

$$N \propto A$$

Figure 2. The Stump Horizon



inherently unstable (Stump refers to this result as the "Mob Rule").

An interesting thing happens with small populations, however. If N is 4, A will be 1; but if N is 3, A will naturally be 0.75. This line between 3 and 4 is described in the literature as the "Stump Horizon" (*figure* 2). Outside the Stump Horizon ($N \geq 4$), anomalies run rampant, effectively ruining any experiment before it has a chance to start. Within the Stump Horizon ($N \leq 3$), Stump's Law still holds; it simply does not matter anymore. As we do not use partial people in experiments, this mathematically proves that one can eliminate anomalies if small enough populations are chosen.

Conclusions

The effects of this result are nothing short of colossal. First and foremost, it calls into question almost all previous scientific conclusions. As most experiments utilize large populations, it is clear that Stump's Law (1999) will negatively impact their results. Further, this will provide a wealth of new research areas for post-Stump scientists as they begin the long process of re-establishing old experiments. As many results will undoubtedly change, new fields of study will appear with great frequency.

The second major outcome of this study is the effect it will have on the non-scientific community. Scientific studies often use many obscure statistics to correct for anomalous data. This can be confusing and misleading for the casual reader. With the advent of Stump's Law, there is no need to correct for anomalous data since no anomalous data will exist. Scientists can focus on the results rather than the convoluted path to those results. Not only will this increase the interest in the experimental method, it should encourage non-scientists to perform their own experiments. In effect, this study will create a renaissance for science in general.

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